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DYNAMICS OF POPULATION

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DYNAMICS OF POPULATION

SOCIAL AND BIOLOGICAL SIGNIFICANCE OF CHANGING BIRTH RATES IN THE UNITED STATES

BY
FRANK LORIMER

AND

FREDERICK OSBORN

NEW YORK
THE MACMILLAN COMPANY
1934

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Set up and printed. Published October, 1934.

PRINTED IN THE UNITED STATES OF AMERICA

ACKNOWLEDGMENTS

The writers express their sincere thanks to those who have read and criticized the whole or parts of this work at various stages in its preparation: Mr. Robert C. Cook, Editor of *The Journal of Heredity*, Professor Henry Pratt Fairchild of New York University, Dr. Harry H. Laughlin of the Eugenics Record Office, Dr. Alfred J. Lotka of the Statistical Bureau of the Metropolitan Life Insurance Company, Professor Gardner Murphy of the Department of Psychology of Columbia University, Dr. Frank W. Notestein of the Milbank Memorial Fund, Professor H. F. Perkins of the University of Vermont, Dr. Paul Popenoe of the Human Betterment Foundation, Professor Lowell J. Reed of the School of Hygiene and Public Health of Johns Hopkins University, and Dr. Clark Wissler of the American Museum of Natural History.

They are indebted for the use of materials prior to their publication or for other important contributions to research procedure to Dr. Grace Baker of the Johns Hopkins Hospital, Dr. O. E. Baker of the United States Bureau of Agricultural Economics, Dr. Barbara S. Burks of the Institute of Child Welfare of the University of California, Dr. Forrest Clements of the Department of Anthropology of the University of Oklahoma, Reverend Henry S. Huntington, Professor Ellsworth Huntington of the Department of the Social Sciences of Yale University, Mr. Howard W. Green of the Cleveland Health Council, Dr. Otto Klineberg of the Department of Psychology of Columbia University, Dr. Hildegarde Kneeland, Dr. Hazel Stiebeling, and Dr. Faith Williams of the United States Bureau of Home Economics, Dr. Alfred J. Lotka of the Statistical Bureau of the Metropolitan Life Insurance Company, Dr. Frank W. Notestein of the Research Division of the Milbank Memorial Fund, the Occupational Bureau of Barnard College, Dr. Persis Putnam of the Rockefeller Foundation, Mrs. Caroline H. Robinson, Dr. Gladys C. Schwesinger, Dr. William F. Snow of the American Social Hygiene Association, Dr. Warren S. Thompson and Dr. P. K. Whelpton of the Scripps Foundation for Research in Population Problems, Dr. Leon E. Truesdell and Dr. Alva M. Edwards of the Population Division and Dr. Elbertie Foudray of the Division of Vital Statistics of the United States Bureau of the Census, and the Adjutant General's Office of the United States War Department.

The authors are greatly indebted to owners of copyrighted materials who have graciously permitted their reproduction in this work. The sources from which all such materials have been drawn are indicated briefly in their context, and more extended description of titles and publishers is given in the Bibliography. Special thanks are due the McGraw-Hill

Book Company, Inc., publishers of *Recent Social Trends in the United States* and the *Recent Social Trends Monograph Series* from whom the supply of copyrighted materials has been most extensive.

The writers are indebted to Mrs. Olive Kephart, Mrs. Anne Johnstone, and Mr. Loring Wood for research assistance, and to Miss Kathleen Harris for final preparation of the manuscript. They have been greatly aided by research facilities and services provided by the American Museum of Natural History and by the Library of Congress.

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PART I

POPULATION TRENDS OF AMERICAN GROUPS

CHAPTER I

THE TREND OF THE NATIONAL POPULATION

1. *Observations on Population Growth in the United States*

Population growth in the United States, as in other industrial nations, is gradually slowing down. The swift expansion of European peoples during the last few centuries, as new economic processes and scientific medicine broke the force of primitive "positive checks" on population growth, is now being counteracted by "preventive checks," causing lower birth rates. On this all qualified students are agreed, although they differ as to the exact date at which gross increase may be expected to cease, absolutely, and as to whether or not this event is likely to be followed by a period of considerable population decrease.

Any suggestion that population growth in this country is coming to a halt may at first seem surprising in the face of an increase of some seventeen million people between 1920 and 1930, the largest total increase ever recorded for any decade, or in view of the fact that the crude birth rate is still some 50 per cent higher than the crude death rate. Yet one significant indication of a change in population trend is immediately apparent on examination of the latest census statistics. In 1930, for the first time in our history, fewer children were reported as under 5 years of age than at the time of the previous decennial census. Again, in 1930, the number of children aged 0–4 years, inclusive, was apparently less than the number of children aged 5–9 years, who represent the survivors of children aged 0–4 years in 1925. The latter comparison is subject to some ambiguity because children under 5 years of age are always less completely enumerated than older children or adults. But this consideration does not affect the comparison between the number of children under 5 years of age enumerated in 1920 and in 1930. The decrease in the number of young children in the United States shows that population increase in this country is falling off. Birth registration statistics tell the same story. After making adjustments for the lack of data from some states and for incompleteness of registration, Thompson and Whelpton have estimated that there were about 2,800,000 births in the United States in 1915. Fluctuations due to wartime conditions appear in a sharp drop in 1919 and a peak in 1921; but we find that the estimated number of births for 1925 is practically identical with that for 1915, in spite of the increase in total population during the interval; and the corresponding estimate for the year 1932 is slightly below 2,400,000 births (Thompson and Whelpton, 1933a, p. 266). An official release by the

Bureau of the Census indicates that in 1933 the total number of births in the Continental United States, exclusive of Texas, was only 94.2 per cent of the corresponding figure for 1932. Incidentally, the year 1933 marks the inclusion of all the states in the birth registration area for the first time. The total number of births as officially reported for 1933 is less than two million one hundred thousand, with an estimated birth rate of 16.4 births per year per 1,000 total population. If adequate allowance were made for the proportion of births that escape registration, this total number might be raised to something like 2,200,000 births in 1933, with an adjusted crude birth rate of about 17.4 births per year per 1,000 total population. There were about 1,400,000 deaths per year in the United States in the years immediately preceding our participation in the World War, according to the estimates by Thompson and Whelpton. Since that time increase in total population has been offset by decrease in death rates, so that the average number of deaths per year during the period 1930–1932 was practically the same as in the late pre-war period. Thus the total number of deaths each year has been remaining fairly constant, while a consistent decrease has been taking place in the total number of births. Our national population is still growing quite rapidly; but the margin between the number of births and the number of deaths each year is constantly being narrowed. The sources of future population increase are being gradually contracted. In fact, the increase that is now taking place can be attributed wholly to a peculiarity of age distribution at the present time. There is a much greater preponderance of young adults than can be expected in the future—and young adults not only bear all the children but they have much lower death rates than aged people.

Recognition of the influence of age composition on reproduction rates has recently led to important changes in methods of predicting future population increase. In the newer approach, as represented by the work of Thompson and Whelpton in the Recent Social Trends series, estimates of population growth are based on an analytical treatment of specific death rates for persons of each sex at given ages, fertility rates for women at given ages, and estimated numbers of persons of each sex expected to be living at different ages at specified times in the future. Recent estimates of population growth based on this analytical procedure run very much below the best earlier estimates (*see* Figure 1). Population change during the years 1920–1933 has been below the "medium" estimate by Thompson and Whelpton, and approximately in line with their "low" estimate, as given in *Population Trends in the United States*, Table 88, Column B (Letter from Warren S. Thompson, June 11, 1934). There is likely to be some release of births with improvement in economic conditions; but it is unlikely that there will be any such rebound as occurred when the conditions of war gave way to the elation of victory and new confidence in the future. It is probable, therefore, that population growth during the next few decades

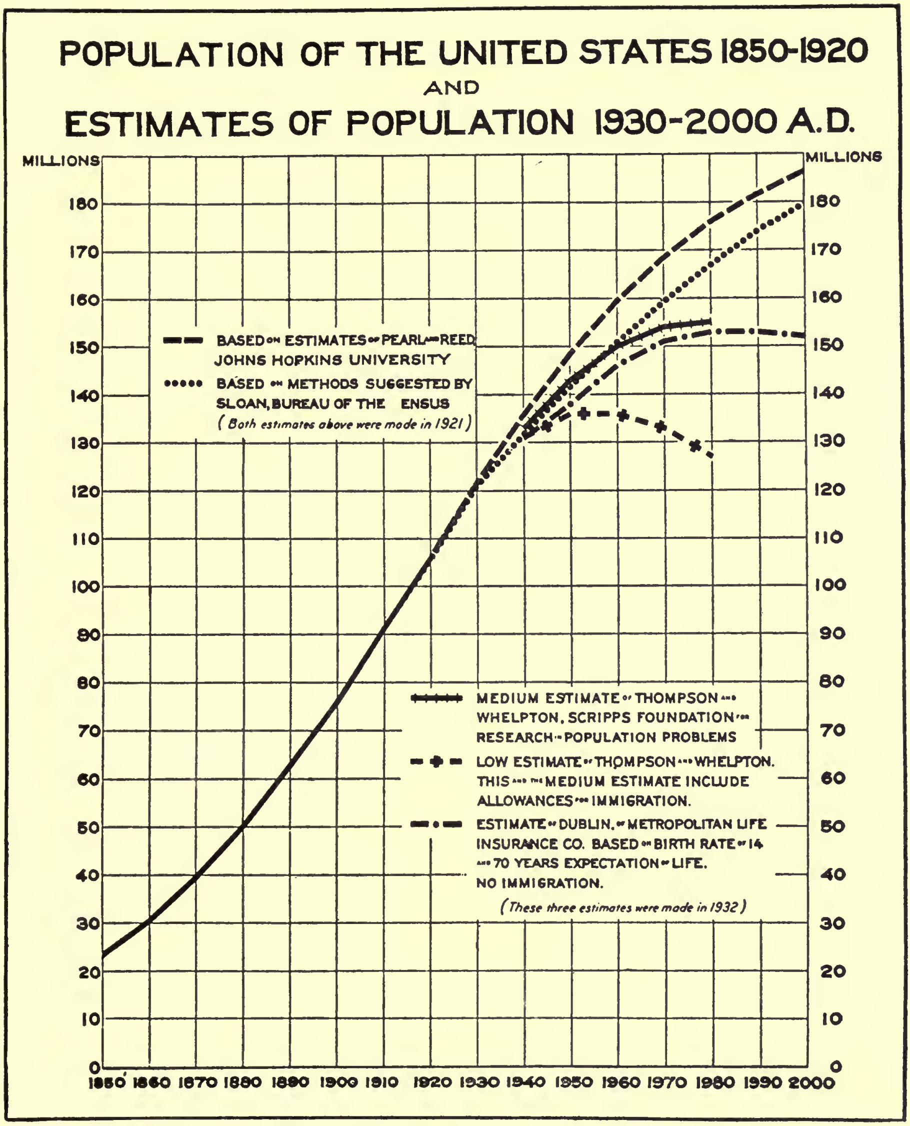

FIG. 1. POPULATION OF THE UNITED STATES, 1850–1930, AND ESTIMATES FOR 1930–2000. From Baker, O. E., 1933, "Rural-Urban Migration and the National Welfare," *Annals of the Association of American Geographers*, Vol. 23, p. 93. The earlier estimates by Pearl and Reed and by Sloane represent projections into the future of curves fitted to gross population growth before 1920. Later estimates indicate an earlier cessation of growth with a lower maximum population. The estimate by Dublin, 1932, agrees closely with the "medium" estimate by Thompson and Whelpton. The latter authors now regard this "medium" estimate as too high.

will run somewhere between the paths charted by the "medium" and the "low" estimates of Thompson and Whelpton.

There is a fixed distribution of population, by age and by sex, to be expected with any given set of age-specific fertility rates for women, age-specific death rates for males and for females, and ratio of males to females at birth. Such a theoretical distribution of population may be called the normal population corresponding to these specific rates.[1] An actual population differs from its corresponding normal population only in so far as the actual population may have been influenced by migrations or by the effects of vital conditions no longer in force. Past tendencies, such as high death rates no longer prevalent, or immigration that has stopped, may have hang-over effects on the composition of population that will be appreciable for more than a generation; but any population tends gradually to conform to the normal distribution appropriate to its true vital conditions, except as influenced by further immigration or emigration.[2] The normal population corresponding to the specific death rates, specific fertility rates, and sex ratio at birth of the white population of the United States in 1930 is shown in outline in Figure 2. This outline may be thought of as picturing "the shadow of the future" as regards the age composition of the white population of the United States.[3]

A general rate of births, deaths, or natural increase (e.g., per 1,000 total population) that would be expected in a normal population at given age-specific fertility rates for females and age-specific death rates for males and for females is called a *true* rate. "True" rates differ from "crude" rates only in so far as the latter are influenced by temporary abnormalities or irregularities in the age and sex composition of any population. True rates are, therefore, more useful than crude rates in studying long-time population trends or in comparing the reproductive tendencies of groups that differ greatly in structure.[4] Unfortunately, true rates in this technical sense may not be true rates in the ordinary sense of this noble word, because of imperfections in the source data on which they are based. A further adjustment is often needed if proper allowance is to be made for inaccuracies in official birth and death reports, and this further adjustment may involve many uncertainties. Nobody knows just how incomplete our official vital statistics may be at the present time. Thompson and Whelpton have estimated that in 1920 and in 1930, among whites, 6.9 per cent of all births and 2 per cent of all deaths escaped registration, with much greater irregularities in vital statistics for Negroes (1933a, pp. 234, 266). These estimates probably represent the best guess that is possible. Figure 3 shows the relation between results obtained for the white population of the United States in 1920 and in 1930 by the use of "crude" rates, "true" rates, and "adjusted" true rates. These different types of rates are inserted in the formula for the "Vital Index," as defined by Pearl (1924, pp. 227–228):

---

[1] Dublin and Lotka, 1925, call such a theoretical population a stable population, because it exhibits the properties of a population with stabilized (i.e., constant) vital conditions. The word *normal* is substituted in the text above to avoid confusion for the lay reader between the terms *stable* and *stationary*, which have quite different technical meanings.

[2] The normal population can be calculated for a growing population, with fixed specific rates (*see* Dublin and Lotka, 1925). In the case of a population at reproductive equilibrium, which as we shall see happens to be the situation of the United States at present, the normal population can be derived directly from life-table values (*see* Appendix B).

A life-table population shows the number of persons of each sex who may be expected to be living in each age class, at given death rates (assuming a given ratio of male to female infants at birth), on the hypothesis of an equal number of births occurring indefinitely in successive years—e.g., on the hypothesis of 106,000 births of male infants and 100,000 births of female infants per year. Such a theoretical life-table population is, by definition, a stationary population, since it is based on the hypothesis of constant death rates and a constant number of births in successive years.

[3] Vital conditions are exhibited in this and in the following diagrams for the white population only, because the corresponding data for the Negro population are much less complete and much less accurate. In general, tendencies in the Negro population indicate a growth trend which seems at present to be quite similar to that for the white population (*see* Chapter III).

[4] *See* Appendix A for a brief statement of the method of computing true rates, as developed by Dublin and Lotka, 1925.

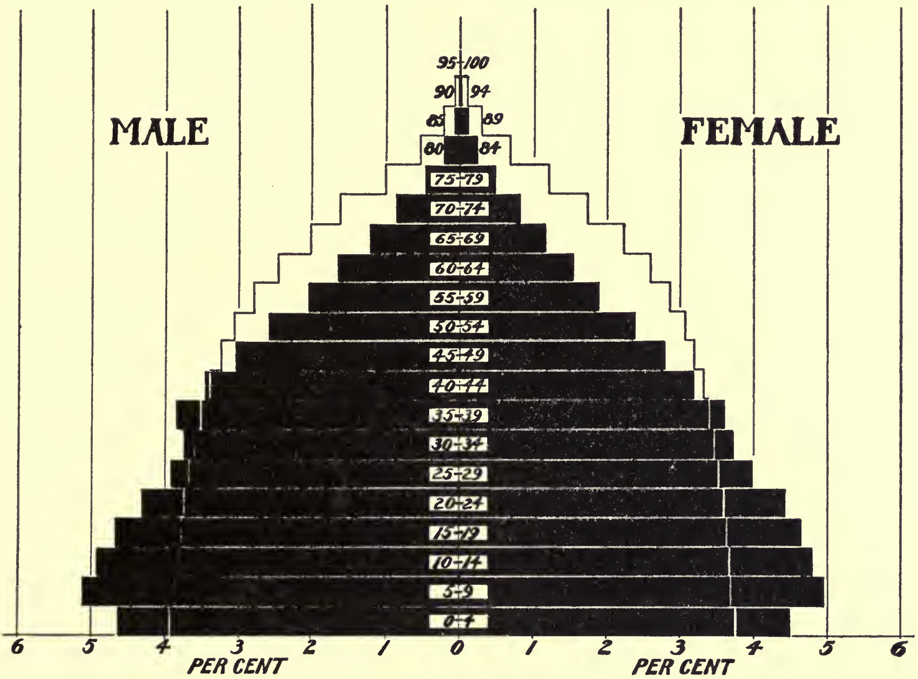

Fig. 2. Distribution of White Population by Sex and by Five-Year Age Periods in 1930 (Solid Black Rectangles), with Corresponding Normal Population (in Outline). Based on Census data and life tables prepared by the Metropolitan Life Insurance Company. The numbers in the center denote age classes. The distance from the center to the end of each bar, in each direction, represents the percentage of the total population that is comprised in that age and sex class. For example, boys aged 5–9 years now make up slightly more than 5 per cent, and girls, aged 5–9 years, slightly less than 5 per cent of the total population. As the population approaches the conditions expected at *present* specific death rates and birth rates, children of each sex at these ages will come to make up less than 4 per cent of the total population.

$$\text{Vital Index} = \frac{\text{Births}}{\text{Deaths}} \times 100.$$

This is a device intended to exhibit the reproductive tendency of any group by a single, convenient figure.[5] Obviously, the results obtained are very different when different types of rates are used.

Using true rates for the white population of the United States in 1930, the dial-hand representing the Vital Index points almost directly up to 100, indicating a population at reproductive equilibrium. Using the "adjusted" true rates, a slight natural increase is indicated, at a rate of some 3.5 per cent, once every 60 years.[6] However this slight margin has been eaten away during the years of economic depression immediately following 1930. All we can now say with certainty is that at present (1934) the population of the United States is approximately at reproductive equilibrium. The slight margin of true natural increase or true natural decrease (the latter being the more likely) at the present time is less than the margin of error in our official vital statistics.

Another and different approach may help to make clearer the implications of this conclusion, and it will introduce the reader to a simple statistical device which will be used extensively in this book. Populations differing greatly in structure can be compared quite accurately, as regards fertility, by using ratios of children to women, such as:

Children under 5 years per 1,000 women aged 20–44 years, or
Children under 5 years per 1,000 women aged 15–44 years, or
Children under 5 years per 1,000 married women aged 15–44 years.[7]

Such ratios can be derived directly from census data and they are free from the most serious disturbances that affect crude birth rates and crude death rates.[8] Such ratios, of course, take into account only those children, among all born during a previous five-year period, who have survived long enough to be reported by the census-taker as "children aged 0–4 years at their last birthday." Since about half of all deaths of persons under twenty-one years of age occur within the first two years after birth, the use of ratios of children to women supplies, in part, an automatic adjustment for the influence of varying death rates on net reproduction rates. Thus a ratio of children to women may be said to measure "effective fertility," which is something intermediate between gross fertility and net reproduction. We can then go further, and obtain approximate net "reproduction rates per

---

[5] If "true rates" are used, the Vital Index may be given a definite statistical interpretation as $100 \times$ (*one* plus *rate of natural increase per mean length of life*). The *ratio* of the *difference* between number of births and number of deaths to the *number* of deaths $(B-D)/D$ gives the rate of natural increase per mean length of life. Using the conventional symbol for average complete expectation of life at birth ($\overset{0}{e}_0$), the relation of the Vital Index (V.I.) to the rate of natural increase per year (r) is, for a normal population: $\frac{V.I.}{100} = (1+r)^{\overset{0}{e}_0}$.

[6] *See* previous footnote.

[7] *See* Appendix A for discussion of the relative advantages of these different types of ratios.

[8] In addition to disturbances due to variations in age composition, comparisons between rural and urban communities on the basis of crude rates are seriously distorted by the practice of allocating births and deaths according to the location of the mother or decedent at the time of the event recorded (e.g., in a city hospital), rather than according to usual residence.

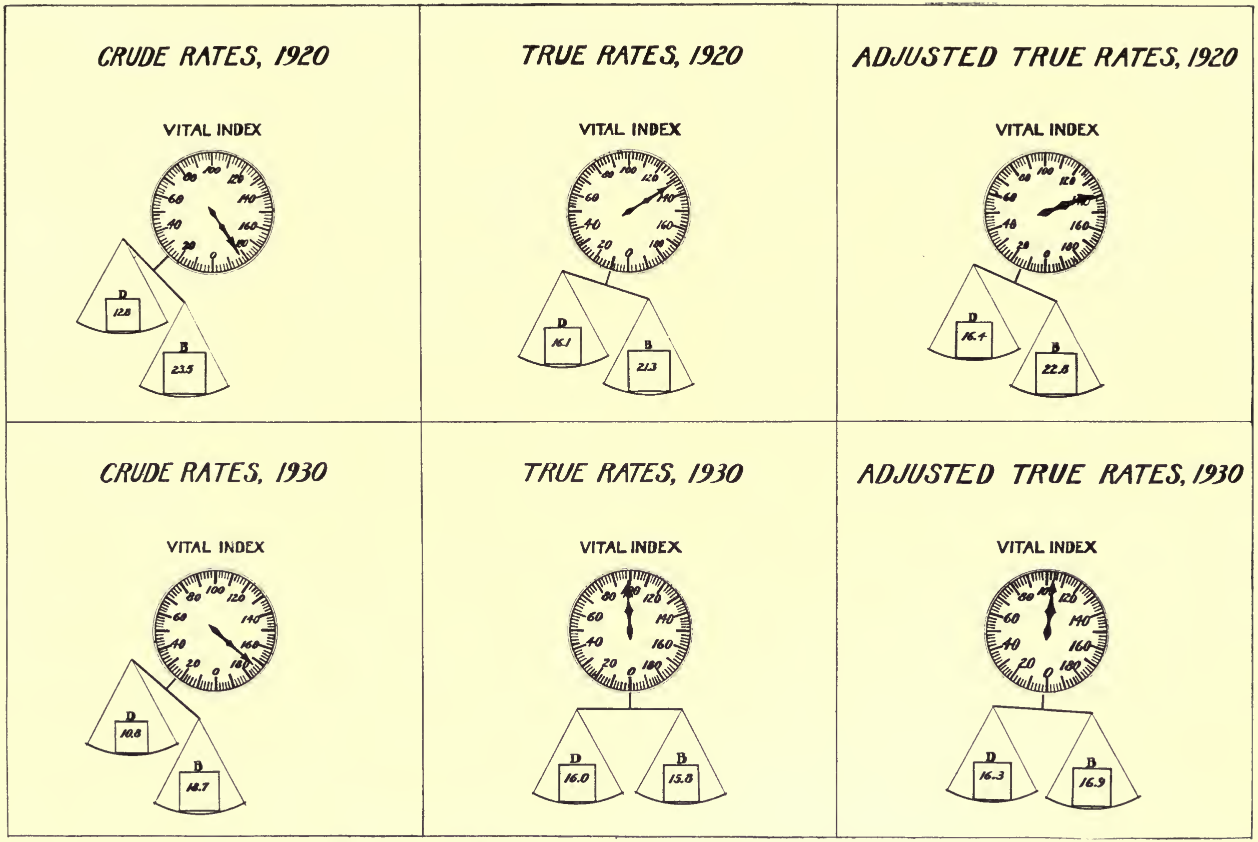

FIG. 3. CRUDE BIRTH AND DEATH RATES, TRUE RATES, AND ADJUSTED TRUE RATES, WITH CORRESPONDING VITAL INDICES FOR 1920 AND 1930 (*see* TEXT).

generation" by comparing the observed number of children with the estimated number needed to supply just so many adults at reproductive ages in the next generation as are living in any group at any time.[9] Thus, in 1930, there were 481 children under 5 years of age per 1,000 women aged 20–44 years in the white population of the United States. At that time, using life tables prepared by the Metropolitan Life Insurance Company, we may estimate that the presence of 443 white children in the age class 0–4 years would be sufficient to insure the continuous replacement of 1,000 women in the age class 20–44 years. Dividing 481 by 443, we get the figure 1.08, as the estimated net reproduction rate per generation for the white population of the United States during the five-year period ending in 1930. Since the average birth rate of the white population of the United States was about 8 per cent higher during this five-year period than in 1930, we again arrive at the result that the white population of this country was approaching reproductive equilibrium in 1930. In other words, the rate at which children are being born is such that the number of women of childbearing age living some thirty years from now will be approximately equal to the number of such women at the present time, apart from changes resulting from immigration and emigration.

Applying the same technique to state populations, we find very diverse reproductive tendencies among native whites in different parts of the country.[10] Such variations are shown in Figure 4.

The lowest reproduction rates among native whites appear along the North Atlantic and the Pacific coasts. In California, we find a tendency to a reproductive loss of about 30 per cent per generation. In general, the native white population in the states around the Great Lakes, in the period represented by these figures, was just about at reproductive equilibrium. Reproduction rates rise in the more rural parts of the country and in the South. The highest reproductive levels are found in the Southern Appalachian areas, evidenced in the high rates for West Virginia, Kentucky, North Carolina, Georgia, Alabama, and Tennessee, and in a row of Rocky Mountain states, New Mexico, Utah, and Idaho.

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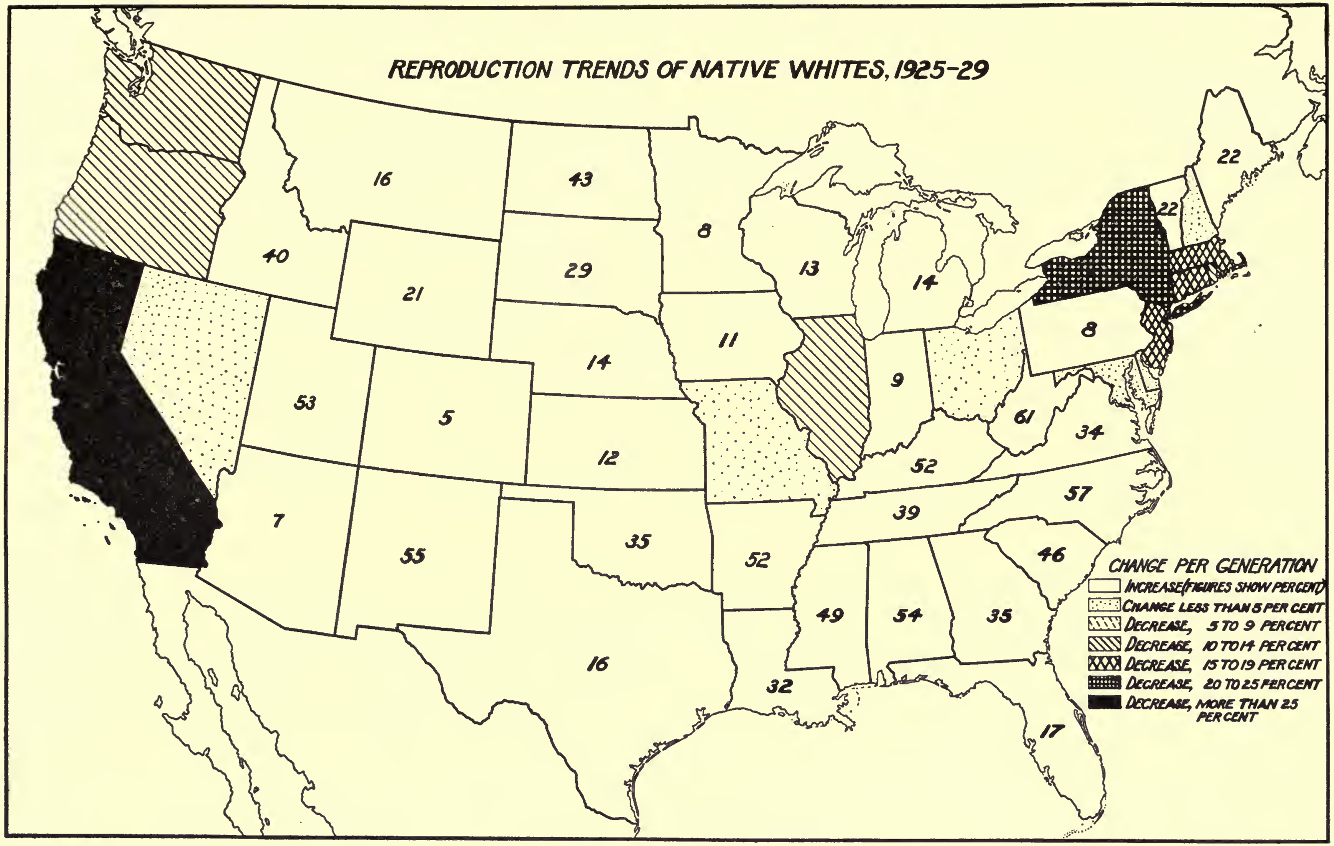
[9] Such replacement quotas can be derived directly from life tables (*see* Appendix A).

[10] There are two sources of error in the procedure followed here. In the first place, of course, only enumerated children can be taken into account. It is generally recognized that there is a consistent under-enumeration of children under 5 years of age. We estimate, on the basis of figures for such children ten years older ten years later, that there must have been about 4.5 per cent more white children and about 15.6 per cent more Negro children under 5 years of age in 1920 than the census-takers reported (*see* Appendix A). Since, in general, census errors run higher in the less developed parts of the country, where fertility rates also tend to be high, this source of error probably tends to minimize rather than to exaggerate regional variations in reproduction rates. Another source of error, perhaps even more serious, tends to have the opposite effect. Life tables are not available for separate states for 1930, and separate tables are available for only a few states for 1919–1920. Replacement quotas for particular states in 1919–1920 show relatively small variations (*see* Appendix A, and also Figure 5). Accordingly, observed ratios for native whites in particular states are here combined with a replacement quota for the total white population of the United States in 1930. Since, in general, high death rates tend to be associated with high birth rates, this procedure may exaggerate regional variations in net reproduction rates, perhaps by as much as 10 per cent in some instances.


REPRODUCTION TRENDS OF NATIVE WHITES, 1925-29
16
43
22
8
40
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13
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22
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11
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9
53
5
12
61
34
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57
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49
54
35
16
32
17
CHANGE PER GENERATION
INCREASE (FIGURES SHOW PERCENT)
CHANGE LESS THAN 5 PER CENT
DECREASE, 5 TO 9 PERCENT
DECREASE, 10 TO 14 PER CENT
DECREASE, 15 TO 19 PER CENT
DECREASE, 20 TO 25 PERCENT
DECREASE, MORE THAN 25 PER CENT

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BUREAU OF AGRICULTURAL ECONOMICS

FIG. 4. REPRODUCTION TRENDS OF NATIVE WHITES IN THE UNITED STATES. Estimated percentage changes per generation in the native white population of each state, as indicated by the effective fertility of native white women in that state during the period 1925–1929, and the age-specific death rates of whites in the entire United States in 1930.

TABLE 1

ESTIMATED AVERAGE SIZE OF COMPLETED FRATERNITIES, ACCORDING TO BIRTH ORDERS OF CHILDREN BORN IN 1929 TO NATIVE WHITE MOTHERS, AND AVERAGE NUMBER OF CHILDREN UNDER 5 PER NATIVE WHITE MARRIED WOMAN AGED 15–44 YEARS IN 1930, FOR EACH STATE (EXCEPT MASSACHUSETTS, SOUTH DAKOTA, AND TEXAS) *

States	Estimated Average Completed Fraternity	Children under 5 per Married Woman, Aged 15–44 Years
Alabama	3.58	.82
Arizona	2.91	.57
Arkansas	3.46	.77
California	2.39	.41
Colorado	2.61	.60
Connecticut	2.70	.58
Delaware	2.94	.56
District of Columbia	2.33	.41
Florida	2.96	.64
Georgia	3.39	.75
Idaho	3.36	.74
Illinois	2.69	.54
Indiana	3.27	.61
Iowa	3.18	.65
Kansas	3.13	.63
Kentucky	4.02	.81
Louisiana	3.35	.74
Maine	3.44	.72
Maryland	3.27	.61
Michigan	3.05	.64
Minnesota	3.25	.70
Mississippi	3.67	.80
Missouri	3 03	.58
Montana	2.94	.65
Nebraska	3.09	.66
Nevada	2.96	.51
New Hampshire	3.11	.67
New Jersey	2.64	.54
New Mexico	4.13	.82
New York	2.59	.53
North Carolina	3.81	.87
North Dakota	3.30	.88
Ohio	2.99	.59
Oklahoma	3.16	.69
Oregon	2.60	.49
Pennsylvania	3.12	.67
Rhode Island	2.95	.65
South Carolina	3.74	.81
Tennessee	3.39	.76
Utah	3.39	.85
Vermont	3.54	.72
Virginia	3.66	.77
Washington	2.66	.50
West Virginia	3.87	.86
Wisconsin	3.04	.68
Wyoming	3.05	.63

Coefficient of correlation: $r = +.894 \pm .020$

* Computed by Putnam, Persis, 1934, using technique by Burks, 1933, on basis of *Birth, Stillbirth and Infant Mortality Statistics for the Birth Registration Area of the United States, 1929,* and values by Lorimer, 1933. Correlation by Putnam. (Unpublished results, reported at Conference on Birth Control and National Recovery, 1934.)

Similar results have been obtained by Putnam (*see* Table 1) by using sizes of completed fraternities (average numbers of children ever-born per mother per lifetime) for native white mothers in different states, using 1929 data. The variations among states indicated by this computation move, in general, in the same direction as the variations shown in the preceding diagram, but they are somewhat damped because in this procedure no account is taken of the proportion of wives who remain childless or of the proportion of women who are not married. The first of these factors, but not the second, is taken into account in the figures, in the second column of the same table, for children under 5 per 1,000 married native white women aged 15–44 years.

Variations in effective fertility among different groups are very large, whereas variations in the corresponding replacement quotas are relatively small (*see* Figure 5). The replacement quota for an "ideal population" with no deaths between birth and the end of the reproductive period (represented by the bottom line in Figure 5), shows the absolute limit beyond which no reduction in replacement requirements is possible, no matter how much improvement there may be in health conditions.

It is important to view these regional differentials in fertility and reproduction with historical perspective. The first census reports for the United States show a doubling of the population once every twenty-five years or so, although there was little immigration at that time. Thus our young Republic started off with a "reproduction rate" approaching 200 per cent per generation, or a "rate of natural increase" of some 100 per cent per generation. But effective fertility for the country as a whole began to decline steadily, almost from the very founding of the nation. The decline at first was most rapid in the more industrial North Atlantic states, and it reached a low level among native whites in New England and New York about 1900. Since that time there has been little change in the effective fertility of native whites in New England or in most sections of New York State, at least if comparisons are limited to particular areas so that the effect of increased urbanization is eliminated.[11] Yet, although fertility among native whites in New England was at least temporarily stabilized about 1900, the fertility of native whites on the Pacific Coast has continued to drop, until figures for California in 1930 show an all-time low rate of reproduction (69 per cent per generation, i.e., with effective fertility equal to about two-thirds of the corresponding replacement quota [12]).

In most parts of the country, decline in fertility was proceeding rapidly in the native white population during the first three decades of the Twentieth Century. It has proceeded even more rapidly among foreign-born whites, especially since the time of the World War and the subsequent

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[11] *See* Spengler's presentation of general fertility rates for native whites in New England states (abstracted in Appendix D).

[12] *See* Appendix C.

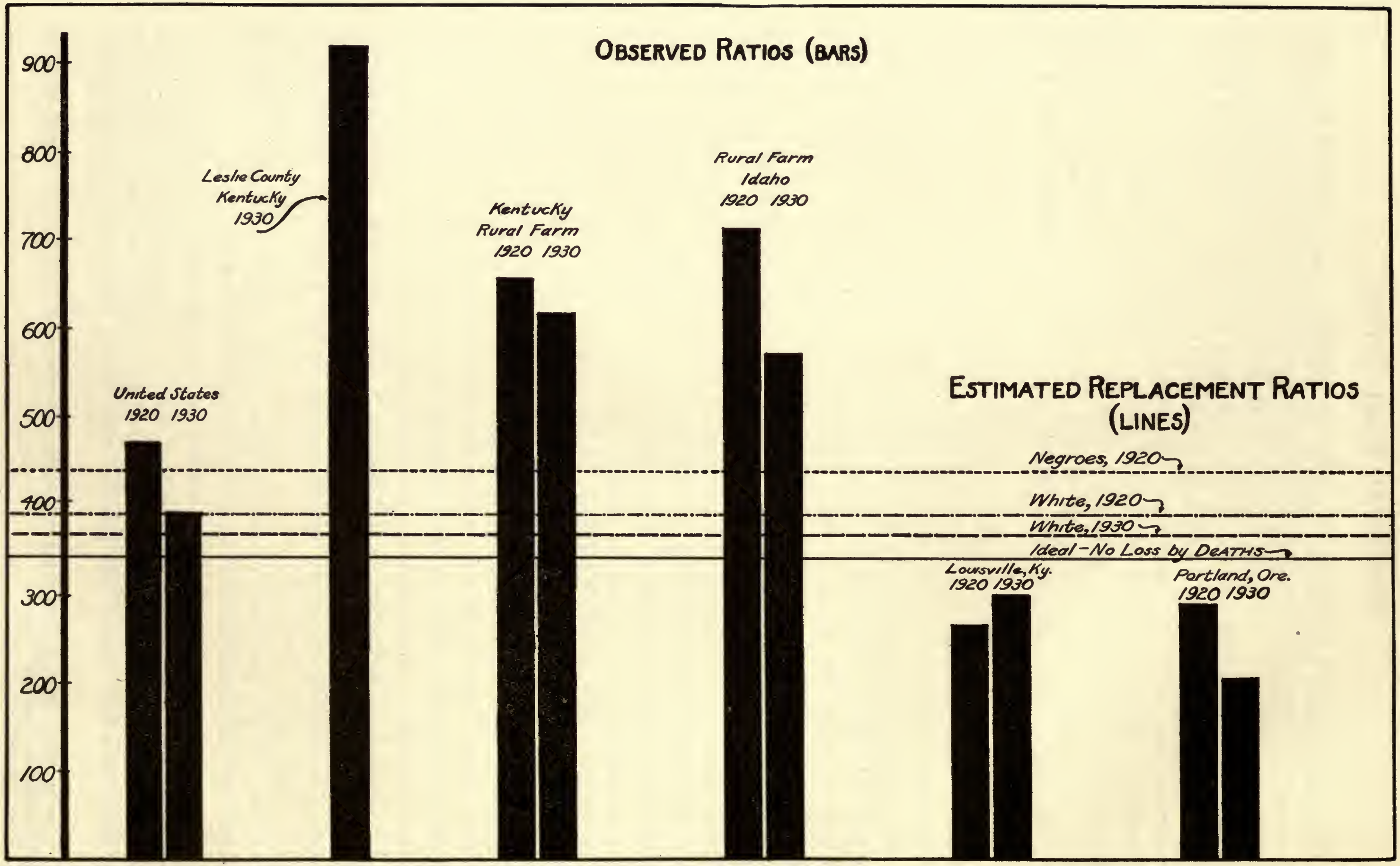

FIG. 5. VARIATIONS IN ACTUAL RATIOS OF CHILDREN TO WOMEN OF CHILDBEARING AGE AND IN CORRESPONDING REPLACEMENT QUOTAS (*see* text).

restriction of immigration. Among native white stocks the decline in fertility during the Twentieth Century has been most rapid in sections where birth rates were very high in 1900. The tendency toward reduced fertility has proceeded with a rush in some of the Southern states, especially in the Gulf states, and in some of the Prairie and Rocky Mountain states, sometimes with a drop of 30 to 40 per cent in the effective fertility of married native white women during a thirty-year period (*see* Figure 6).

There seems to be only one section of the country that has remained, as yet, quite untouched by the trend toward limited fertility. Reproduction seems still to be proceeding in the most remote portions of the Southern Highlands at about the early American level. However, in 1930 this statement appears to be strictly true for only one county, Leslie County, where there is but one automobile for every hundred farms and where less than one per cent of all workers are employed in transportation and communication.[13] If Kentucky Appalachian counties, exclusive of the mining areas, are grouped according to degrees of isolation, one finds a series in degrees of effective fertility of farm population by groups of counties that parallels very nicely the secular series for the whole population of the United States from 1820 to 1860 (*see* Figure 7). Apparently the pattern of family limitation is beginning to penetrate farther and farther into the recesses of the Cumberland Plateau.

Decline in reproduction rates for native whites during the years 1920–1930, even after making allowance for the effect of improved health conditions on survival values, appears in every section of the United States except New England and the Middle Atlantic division (*see* Table 2, below). In this part of the country, as we have already noted, the decline in fertility had begun to strike bottom, among adults born and brought up in this country, before 1900. The situation of the native stock in New England in this respect is similar to that of the population of France, where after a century of birth rate decline a tendency toward stabilized fertility is now apparent. The situation in New England may also be somewhat influenced by the infiltration of new stocks of European and Canadian origin into the class of native whites—but it is easy to exaggerate this factor.[14] Of course changed conditions may again cause a further decline in effective fertility among native families in this region. It would not be surprising to find a comparable stabilization of fertility, after the restoration of more normal economic conditions, among native whites in the Pacific division and in many cities where fertility rates are now very low. On the other hand, in most of the Southern and Western states, where birth rates are still very high, a decided decline in fertility during the next few decades would seem to be almost inevitable. We do not by any means intend to imply that

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[13] It is possible that the presence in this county of an agency which is interested in preventing infant mortality, but which is indifferent or opposed to family limitation may have some influence on this result (*see* Breckinridge, 1932, "Is Birth Control the Way Out?", in *Harpers*).

[14] For a discussion of this complicated and somewhat controversial topic, *see* Appendix F.

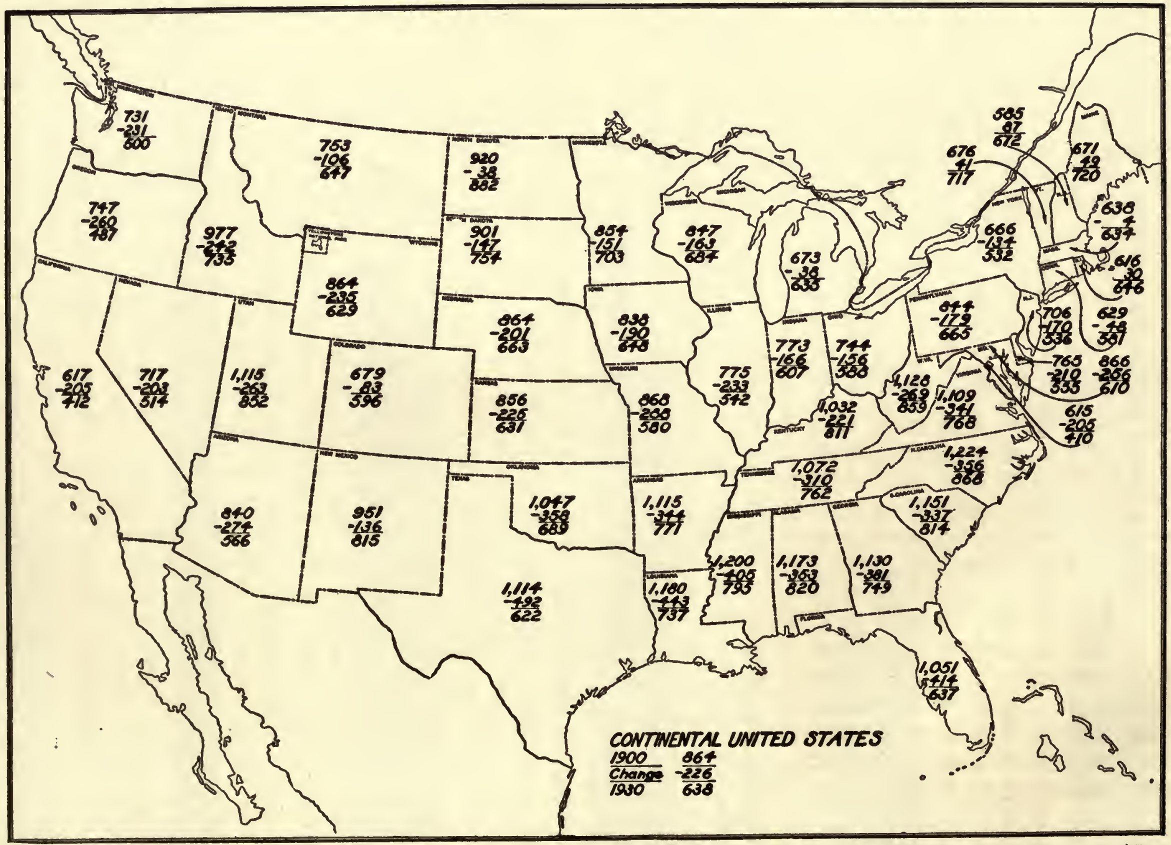

Fig. 6. Children under 5 Years per 1,000 Married Native White Women Aged 15–44 Years, by States, 1900 (Top Figures), 1930 (Bottom Figures), and Change 1900–1930 (Middle Figures). Based on values by Willcox, 1932; with adjustments by Lorimer, 1933, for number of children under 5 years with native mothers but foreign fathers (as estimated for 1900 and given by census data for 1930).

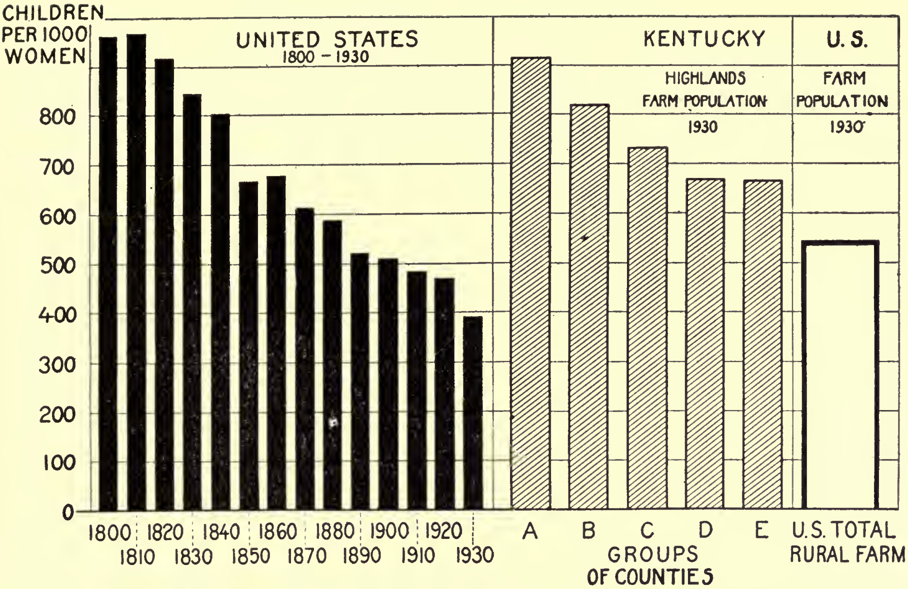

Fig. 7. Children under 5 Years per 1,000 Women Aged 15–44 Years, for the United States, 1800–1930, for Farm Counties in the Kentucky Highlands, 1930, by Degree of Isolation, and for Total Rural-Farm Population of the United States, 1930. The values shown here for the total United States, 1800–1930, are derived, with adjustment for age classification of women, from values by Whelpton, 1928, "Industrial Development and Population Growth," *Social Forces*, Vol. 6, pp. 629–638. Slightly different values for this series are given in Thompson and Whelpton, 1933, *Population Trends in the United States*, p. 263. The data for Kentucky Counties are from the Census, with unpublished data on age distribution of rural-farm population, by counties.

	Kentucky Highlands, counties grouped by degrees of isolation (exclusive of seven counties in which more than one-third of all occupied males were engaged in mining):	Children under 5 years per 1,000 women aged 15–44 years, in rural-farm population:
Group A Leslie	Less than 1 per cent of farms are equipped with autos Less than 1 per cent of workers are engaged in transportation and communication	915
Group B Clay Knott Elliott	Less than 5 per cent of farms are equipped with autos Less than 5 per cent of workers are engaged in transportation and communication	819
Group C Breathitt Jackson Magoffin Martin Owsley Clinton Johnson Lee	Less than 10 per cent of farms are equipped with autos Less than 10 per cent of workers are engaged in transportation and communication	734
Group D Knox Whitley Morgan Wolfe Laurel Rowan Rockcastle Menifee Powell	Less than 15 per cent of farms are equipped with autos Less than 15 per cent of workers are engaged in transportation and communication	668
Group E Wayne Carter Estill Lawrence Pulaski	Less than 20 per cent of farms are equipped with autos Less than 20 per cent of workers are engaged in transportation and communication	665

regional differentials in fertility and reproduction are likely to be levelled out, at least in the near future; but recent trends do indicate that these regional differentials are apt to be modified in the course of the next few decades; and this process will involve a further lowering of the true birth rate for the nation as a whole.

TABLE 2

Indices of Effective Fertility and Reproduction Indices for Native Whites in 1915–1919 (as Shown by 1920 Data) and in 1925–1929 (as Shown by 1930 Data) by Census Divisions[a]

Division	Children under 5 Years with Native White Mothers per 1,000 Native White Women Aged 20–44 Years			Index of Net Reproduction per Generation, with Specified Replacement Quotas. (1.00 Signifies Trend toward Stationary Population.)		
	Ratio in 1920 (Estimated[b]*)*	*Ratio in 1930*	*Ratio in 1930 as per Cent of Ratio in 1920*	*For Whites 1919–1920 (Replacement Quota, 472*[c]*)*	*For Whites 1930 (Replacement Quota, 443*[d]*)*	*Index for 1930 as per Cent of Index for 1920*
Total U. S.	538	479	89.0	1.14	1.08	95
New England	393	407	103.6	.83	.92	110
Middle Atlantic	429	403	93.9	.91	.91	100
E. N. Central	493	452	91.7	1.04	1.02	97
W. N. Central	554	488	88.1	1.17	1.10	94
South Atlantic	713	596	83.6	1.51	1.34	89
E. S. Central	734	656	89.4	1.56	1.48	95
W. S. Central	682	566	83.0	1.44	1.28	88
Mountain	631	550	87.2	1.34	1.24	93
Pacific	388	331	85.3	.82	.75	91

[a] For corresponding values for individual states, *see* Appendix C.

[b] From Thompson, *Ratio of Children to Women, 1920*, pp. 201–202.

[c] Based on *United States Abridged Life Tables, 1919–1920. See* Appendix B.

[d] Based on life tables prepared by Metropolitan Life Insurance Co. *See* Appendix B.

The recent acceleration of the decline in the birth rate caused by the economic depression may be, in part, only temporary in its effects on population growth. Nevertheless, in view of the preceding analysis, we may predict with some assurance that the "true" birth rate for the population of the United States will fall further, and that it will lie for some time below the zero level of equal population replacement. However, in view of the present age composition of our population, some twenty or thirty years will elapse before this tendency can bring about any actual diminution of gross numbers. And at any time, of course, the situation may be changed by a relaxation of quantitative restrictions on immigration—perhaps with a refining rather than a relaxing of qualitative restrictions. Moreover, in the course of a half-century many changes can take place in the vital forces controlling population growth. For example, families with a tradition of high fertility may come to constitute a larger proportion of the total population, thus tending to raise the general fertility rate. This may be illustrated by noting the change in the trend of a total theoretical population, such as that represented in Figure 8, in which by hypothesis the reproduction rate of each component group is held constant. In the judgment of the present writers, differentials in reproduction rates among American groups present far more serious problems than the probable trend of total population of this country in the visible future.

Figure 8 is designed primarily to show the degree to which some groups will be replaced by other groups in the course of a single century in a nation with differentials in reproduction rates that are no greater than the differentials commonly found among large population groups in the United States at the present time.

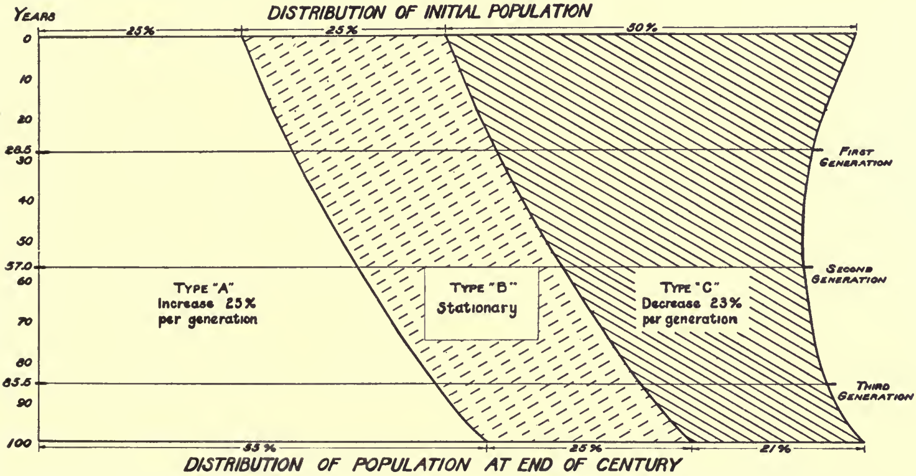

FIG. 8. DIAGRAM SHOWING CHANGE IN ONE CENTURY IN THE COMPOSITION OF A HYPOTHETICAL POPULATION AT SPECIFIED CONDITIONS. By hypothesis the population at the beginning of the century is divided as follows: Type "A," increasing at the rate of 25 per cent per generation, makes up one-fourth of the initial population; Type "B," which is stationary, makes up another fourth; the rest of the population (50 per cent at the start) is decreasing at the rate of 23 per cent per generation. The length of one generation is taken as 28.3 years. It is assumed that there is no immigration or emigration. These conditions are such that the size of the population at the end of the century will be equal to its size at the beginning. But the relative importance of the three component groups (as represented along the bottom line in the chart) will then be very different from their relative importance at the start.

2. *Conclusion and Prospect*

Population growth in the United States is gradually slowing down. Population increase will presumably cease absolutely somewhere from twenty to forty years from now with a maximum population of some 150 millions or less. This event may be followed by some decline in total population for several decades; but there are so many uncertain elements in the picture that it is idle to speculate far into the future.

The present writers see no cause for alarm in this prospect. There need be no fear of population pressure on the natural resources of the United States in the visible future. On the other hand, there is no reason for supposing that the level of living for individuals is likely to be lowered by the stabilization of reproduction in the total population or by a moderate decline. The theory of "optimum population" is at present still in the stage of preliminary definition and clarification (*see* discussions by Fairchild, Robbins, Dalton, Thompson, 1930, and Wolfe). It may be that a higher standard of living for individuals could be maintained in this country with a population very much greater or very much less than 150 million people; we do not know. It is probable that variations in *total* population, within the moderate range predictable for the United States in the visible future, are likely to be far less important in determining our levels of living and our welfare than changes that may be expected in industrial techniques, in the arts, and in social organization.

On the other hand, we believe that the large differentials in reproduction rates among population groups in this country need far more critical attention than they have yet received. Within the total nation, which as a whole is now about at reproductive equilibrium, some groups are rapidly expanding, whereas other groups are declining. Some of these differentials are likely to prove temporary, but others are grounded in fundamental differences in ways of living and are likely to persist indefinitely unless means are found for their social control.

The rest of this book will therefore be devoted to the study of changes taking place within our population. We will begin with an analysis of actual variations in reproduction trends among different groups, classified by size and type of community, by race and national origin, and by social or occupational status. We will give some consideration, as we go along, to the economic significance of present population trends.[15] We will then proceed to a description of certain measurable characteristics of large population groups, because changes in the make-up of a nation are important in proportion as the component groups differ in personal characteristics or in social functions. In a country with a very homogeneous population, differential fertility might be relatively insignificant in its effect. Among a people with specialized interests and activities, diverse traditions, or varied biological characteristics, the changes taking place may be of the utmost importance in shaping national destiny.

Discussion of group characteristics has frequently in the past tended to be emotional rather than scientific, and it has seemed to the present authors that their work should be confined strictly to a discussion of those characteristics which can be measured with some degree of scientific objectivity. Of the many important traits of man, only a few can be so measured at present. Among physical characteristics, growth and bodily proportions can be measured, and incidence rates for various diseases can be determined for particular groups; but the more important qualities determining vitality cannot be measured directly. Among psychological traits, techniques for measuring personality traits are just beginning to reach sufficient refinement to be capable of broad application, but objective and significant measurements of intelligence (cultural-intellectual development [16]) have been carried out extensively so that a variety of valuable results are now available in this field. If, then, we are to confine our work to consideration of measurable characteristics, we are limited to anatomical characteristics, physiological and medical findings, and to variations in intelligence. But, by accepting this serious limitation, we can base our work on objective studies and thus avoid the controversial atmosphere that has been so common in this field.

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[15] *See especially* Chapter II, Section 3.

Most previous students of qualitative population trends have considered only changes in genetic capacities. However, as we realize the far reaching effects of differential reproduction, it becomes evident that population changes may affect the composition and standards of our people wholly apart from any changes in their genetic qualities. Human characteristics grow out of the interaction of environmental and hereditary forces. A large part of our environment—particularly that which reacts upon the development of intelligence—is social environment, handed down from one generation to another. Children tend to be like their parents in part because they are usually brought up in an environment similar to that which has shaped their parents. It is evident, therefore, that the differential increase or decrease of groups with varying social heritage may affect the proportion of different culture-levels in our population, just as the differential increase or decrease of groups with varying biological heritage may affect hereditary capacities. The study of both factors is important.

Many phases of population change will be quite neglected in this volume, as for example, the bearing of reproduction trends on the religious complexion of the nation.[17] The method of approach used in this work, however, is applicable to other investigations of qualitative population trends in so far as they concern measurable characteristics.

After studying the significance of present population trends for the social and for the genetic heritage of the nation, we will turn to an investigation of the physical and social causes that determine variations in fertility among different groups, and the possibility of controlling these forces in such a way that changes in the population may be along lines compatible with social advance.

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[16] *See* Chapter VI.

[17] *See* brief note on this topic at the beginning of Chapter IV.

CHAPTER II

FERTILITY AND REPRODUCTION IN RELATION TO SIZE OF COMMUNITY

1. *Reproduction Trends*

The fertility of the rural population of the United States remained at a fairly constant level during the first half of the Nineteenth Century, although a significant decline was taking place during this period in the fertility of the urban population as a whole. Decrease in the fertility of the urban population continued through the last half of the Nineteenth Century and the early decades of the Twentieth Century, while decline in the fertility of the rural population gradually gained momentum.

Analysis of recent trends in the fertility of the urban population is complicated by the presence of large rural-minded immigrant groups, especially in metropolitan centers. During the last decade these immigrant groups in American cities were rapidly becoming adjusted to American ways of living, so that a sudden drop occurred in the birth rate of the foreign-born population. This drop in the fertility of foreign-born elements caused the appearance of a large decline in fertility for the urban population of the United States as a whole. Thus between 1920 and 1930, there was a decrease of 19 per cent in the ratio of children under 5 per 1,000 women aged 15–44 years in cities of 100,000 or more, and a decrease of 14.8 per cent for cities and villages of 2,500 to 100,000, with a corresponding decrease of 10.7 per cent in the total rural population. However, when the native white

TABLE 3

Children under 5 with Native White Mothers per Thousand Native White Women Aged 20–44 Years for Total, Urban, and Rural Areas of the United States in 1920 and in 1930 *

Areas	Ratio 1920	Ratio 1930	Per Cent Change
Total	538	479	−11.0
Urban	388	366	− 5.7
Rural	721	653	− 9.4
Hypothetical total for 1930, if proportions of total population living in rural and urban areas had remained as in 1920		496	− 7.8

* Estimates for 1920 from Thompson, 1931, pp. 200–201. Data for 1930 (including numbers of children under 5 with native mothers and foreign fathers) from the Census.

population is treated separately, the decline in effective fertility from 1920 to 1930 is found to have been greater in rural places than in cities (*see* Table 3).

Apparently the fertility of native stocks in American cities is beginning to approach stabilization, although some further decline may be expected for several decades. On the other hand, the fertility of the rural population is falling quite rapidly, especially in sections of the country where it is still unusually high, as in many parts of the South and in some of the Western Prairie and Mountain states. It may at first seem surprising that the average decline in effective fertility should appear to be greater for all native whites in the total United States than for native whites in either urban or rural areas considered separately. This result is due to the shift in the relative importance of rural and urban groups during the period in question. Urban areas held 51.4 per cent of the total population in 1920, and 56.2 per cent in 1930 (*see* Figure 9). The growth of urban population at the expense of the rural population undoubtedly accelerated the decline in general fertility during the last decade; but during the years of acute economic depression the general decline in fertility has been intensified, in spite of a considerable shift of population from cities back into rural communities. Rural-urban migrations between 1920 and 1930 also involved some transfer of population from geographical regions with high fertility to geographical regions with low fertility. The New England, Middle Atlantic, East North Central, and Pacific states, where fertility is lowest, contained 53.6 per cent of the total population in 1920 and 55.3 per cent in 1930—the relative decline of New

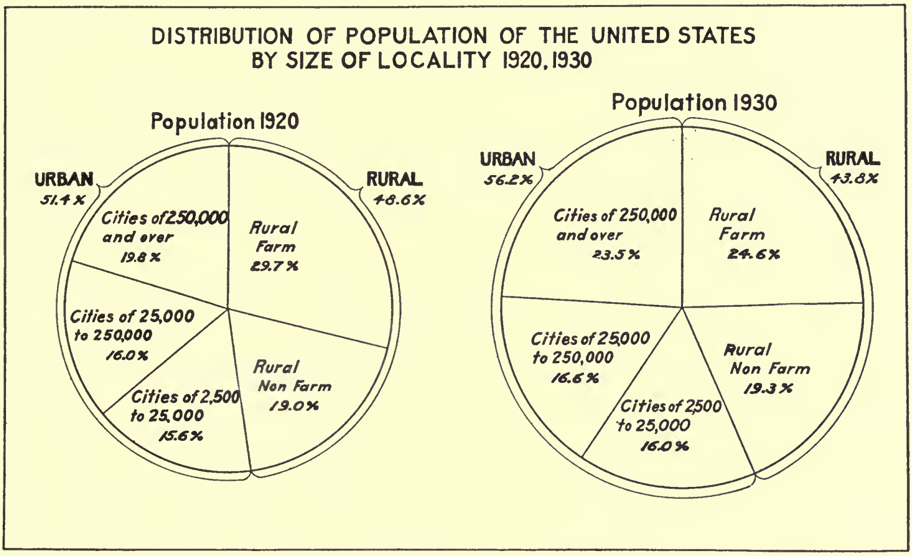

FIG. 9. DISTRIBUTION OF POPULATION OF THE UNITED STATES BY SIZE OF LOCALITY, 1920, 1930.

England in numerical importance being more than offset in this respect by the rapid growth of the Pacific states. But, as already observed, birth rates have been falling most rapidly during recent decades in rural Southern and Rocky Mountain states (Chapter I). If this process continues—and it is likely to for some time—that portion of the present rural-urban differential due to regional variations in fertility will be very considerably reduced. But the persistence of a large rural-urban differential in parts of the country where birth rates are apparently stabilized indicates that such differences in some degree are likely to remain indefinitely.

TABLE 4

Specific Death Rates, Corrected for Residence of Decedent, for Rural and Urban Areas of Ohio and of New York State, Exclusive of New York City, 1930 *

Ages	Ohio Native Whites			New York—All Races		
	Annual Death Rate per 1,000 Persons		*Ratio of Urban to Rural Rate*	*Annual Death Rate per 1,000 Persons*		*Ratio of Urban to Rural Rate*
	Urban	*Rural*		*Urban*	*Rural*	
MALES						
0–4	17.1	16.5	1.04	18.1	16.0	1.13
5–9	2.2	1.9	1.16	2.2	2.1	1.05
10–14	1.5	1.4	1.07	1.6	1.9	0.84
15–19	2.5	2.2	1.14	2.0	3.1	0.65
20–24	2.8	3.6	0.78	2.5	4.5	0.56
25–29	3.2	3.6	0.89	3.3	4.9	0.67
30–34	4.1	3.4	1.21	4.4	4.8	0.92
35–44	5.8	4.8	1.21	6.6	6.6	1.00
45–54	11.3	7.5	1.51	14.6	11.9	1.23
55–64	24.6	16.8	1.46	30.7	23.2	1.32
65–74	56.8	143.6	1.30	61.0	55.7	1.10
75+	137.8	117.4	1.17	145.0	142.1	1.02
FEMALES						
0–4	14.0	13.8	1.01	14.4	14.1	1.02
5–9	1.4	1.5	0.93	1.7	1.5	1.13
10–14	1.1	1.3	0.85	1.2	1.2	1.00
15–19	1.9	2.1	0.90	1.7	2.2	0.77
20–24	2.7	3.4	0.79	2.8	3.3	0.85
25–29	3.3	3.6	0.92	3.5	3.4	1.03
30–34	3.6	3.8	0.95	3.7	3.9	0.95
35–44	4.8	4.6	1.04	5.4	5.1	1.06
45–54	9.6	8.0	1.20	10.5	9.8	1.07
55–64	19.1	16.5	1.16	22.5	19.0	1.18
65–74	44.4	40.2	1.10	50.7	46.8	1.08
75+	118.2	121.3	0.97	131.1	138.4	0.95

* From Sydenstricker, 1933, *Health and Environment*, p. 78. Based on studies by Dorn, for Ohio, and by DePorte, for New York.

In turning to a consideration of survival tendencies in rural and in urban places, we are handicapped by the present practice of allocating deaths to the place where an individual happens to die (as, for example, in a city hospital) rather than to the place where he usually lived. This procedure vitiates all crude death rates for rural and urban groups, as ordinarily reported by state and federal bureaus. It does not, however, have much effect on comparisons between total states. According to the last official life tables for the United States (1919–1920) survival tendencies for children and young people in the more urbanized states were, in general, very similar to survival tendencies in rural states.

An exact comparison of age-specific death rates in rural and in urban areas in the same state is possible on the basis of studies by Dorn in Ohio and by DePorte in New York, with deaths reallocated to the usual residence of the decedents (*see* Table 4).

The results for Ohio and for New York agree very well, in their broad outlines. They seem to show for these regions (1) that death rates for young children are slightly higher in urban places than in rural places both in Ohio and in New York, (2) that among older children and young adults death rates are often lower in urban than in rural places, but (3) that after thirty or forty years of age there is a sharp rise in urban death rates, relative to rural death rates, especially among males. Incidentally, the last phenomenon must affect the relative frequency of widowhood in urban and in rural areas. But the net effect of these conditions on survival rates for females is doubtful. It is possible that the peculiar drop during the late teens and early twenties in death rates for urban residents relative to death rates for rural residents, indicated here, may be in part fictitious. Many young people come from rural homes to live in cities. Invalid young people are presumably less apt to migrate from rural areas, and in case of critical illness many who are already away may return to their parental homes. In so far as this situation affects vital statistics it would, of course, tend fictitiously to exaggerate death rates for rural young people and to lower death rates for urban young people. This distortion may account in part for the peculiarly low ratios of urban deaths to rural deaths indicated for age classes from 15 to 30 years. If we disregard this possible source of error and use the data, presented above, at their face value, variations in survival ratios for females from birth to the weighted center of the childbearing period (*see* Appendix A) may be roughly indicated by comparing the crude sums of specific death rates for females by five year periods from birth to age 30. These sums happen to be identical for rural Ohio (native whites, only) and for rural New York. The corresponding sum for urban Ohio is 95 per cent of this figure—indicating that somewhat fewer deaths would be expected in the case of females born and reared in urban places than in the case of rural females. For New York State (exclusive of New York City) the corresponding relationship is expressed by the ratio, 0.98 to 1. The differences indicated are small, and in view of the possible statistical bias described in the preceding paragraph, these small apparent differences may be spurious. In fact, it is possible that there may really be a slight difference in the opposite direction.

Birth registration data can be used to indicate survival tendencies among young children in different occupational classes. We will use the data for 1928 on "Births with the total and average number of children born and living, to mothers who bore children [in a specified year], by age of mother and occupation of father," [1] as a basis for comparing survival tendencies among farm and nonfarm children. Stillbirths are not included in these statistics. Therefore, children whose births are being registered as live births are ordinarily listed both as "children born" and as "children living." However, in the case of the death of a newborn infant before the filing of the birth certificate, the physician or midwife would presumably include the newborn infant among the "children ever born" but not among the "children living." [2] The disturbance of this irregularity in the statistics which we are seeking cannot be great; and by making various alternative allowances we can gauge its influence fairly accurately. The procedure followed here has the great advantage of dependence on a single set of records so that the statistical hazards involved in matching registration data with census data are eliminated. We find that about 88 per cent (more than 87.3 per cent but probably less than 88.3 per cent) of the children born at previous confinements of farm women were alive when their mothers were

TABLE 5

NUMBER OF CHILDREN LIVING PER THOUSAND CHILDREN BORN ALIVE AT PREVIOUS CONFINEMENTS OF MOTHER, FOR FARM AND FOR NONFARM GROUPS, CLASSIFIED BY OCCUPATION OF FATHER, AS REPORTED BY MOTHERS CONFINED IN 1928 *

Groups Classified by Occupation of Father at Last Confinement of Mother	If All Newborn Were Reported as Living	If Newborn Were Reported as Living except a Proportion Equal to Death Rates for Specified Interval		
		First Day [a]	*First 3 Days* [a]	*First Week* [a]
Farm	873	879	881	883
Nonfarm	854	862	866	869

Ratio of survival value for farm group to survival value for nonfarm group:

(a) If all newborn are reported as living	1.022
(b) If newborn are reported as living except a proportion equal to the death rate for first day	1.020
(c) If newborn are reported as living except a proportion equal to the death rate for first day for urban, and except a proportion equal to the death rate for first 3 days for rural [b]	1.022

* Based on *Birth, Stillbirth and Infant Mortality Statistics for the Birth Registration Area of the United States, 1928.* Table 10.

[a] Adjustments made by official rates for urban and for rural areas to numbers of newborn infants included in each group (data from same source, p. 27).

[b] This relationship seems rather the most likely, because rural physicians would be likely to cover a somewhat longer interval than urban physicians in taking account of deaths of infants on the original birth registration returns.

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[1] Thirty-nine states are represented in these figures. Four New England states, South Dakota, Texas, and three Rocky Mountain states are omitted.

[2] Birth certificates are ordinarily filed within two or three days after the delivery, but practice varies in different localities.

again confined in 1928; but only about 86 per cent (more than 85.4 per cent but less than 86.9 per cent) of the children born at previous confinements of nonfarm women were alive when their mothers were again confined in 1928 (*see* Table 5). Thus, some two per cent more of the farm children than of the nonfarm children appear to have survived the risks of infancy—in spite of the fact that confinements of farm women tend to be spread over a somewhat longer average interval than the confinements of the urban women.

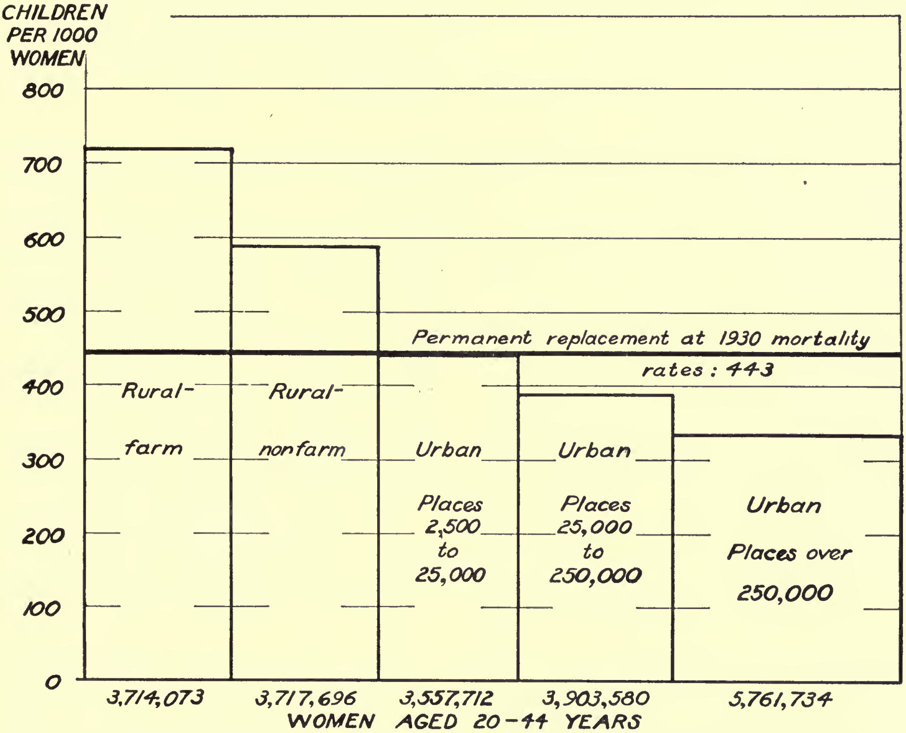


Fig. 10. Effective Fertility Ratios (Children under 5 per 1,000 Women Aged 20–44 Years) for the White Population of the United States, by Size of Community, with Corresponding Permanent Replacement Ratio for Total White Population, 1930.

We are warranted in concluding that the proportion of children surviving infancy is slightly higher in the case of farm children than in the case of nonfarm children. It is possible, as indicated by the statistics for Ohio and for New York State reported above, that the slight initial lead of the rural children may be offset by death rates in the 'teens and twenties that are somewhat higher for rural than for urban residents. But we have already given reasons for doubting the significance of the findings which point in this direction. In any case, we can be sure that the true difference between rural and urban areas in survival values for females, from birth to the center of the reproduction period, is so small as to be quite negligible in comparison with the large, well established differences in fertility between rural and urban communities.

The situation as regards fertility and reproduction in relation to size of community is represented graphically in Figures 10 and 11, and summarized in more detail in Tables 6 and 7. One should note that the series prepared by Baker (Figure 11) gives ratios of children under 5 years to women aged 15–44 years, whereas we usually present ratios for children under 5 years to women aged 20–44 years—so that the values in Figure 11 run from 15 to 20 per cent lower than the type of ratio used in most of the other series in this book. One should also note that the ratios presented in this diagram are for total population, white and Negro combined.

TABLE 6

CHILDREN UNDER 5 PER 1,000 WHITE WOMEN AGED 20–44 YEARS, BY SIZE OF COMMUNITY 1820, 1910, 1920, AND 1930 *

Community Classes	1820	1910	1920			1930		
	Total White	*Total White*	*Total White*	*Native White*	*Foreign Born*	*Total White*	*Native White*	*Foreign Born*
Total		609	581	538	779	481	479	489
Urban, total		469	471	388	727	384	366	460
500,000 and over		474	455	334	664	347		
250,000–500,000		427	393	328	681	335		
100,000–250,000	827	409	449	381	758	384		
25,000–100,000	786	460	472	390	766	393		
2,500–25,000	906	507	521	459	868	442		
Rural, total	1,286	782	744	721	998	653.0	652.5	661
Rural-nonfarm			669			589	587	603
Rural-farm			802			718	715	769

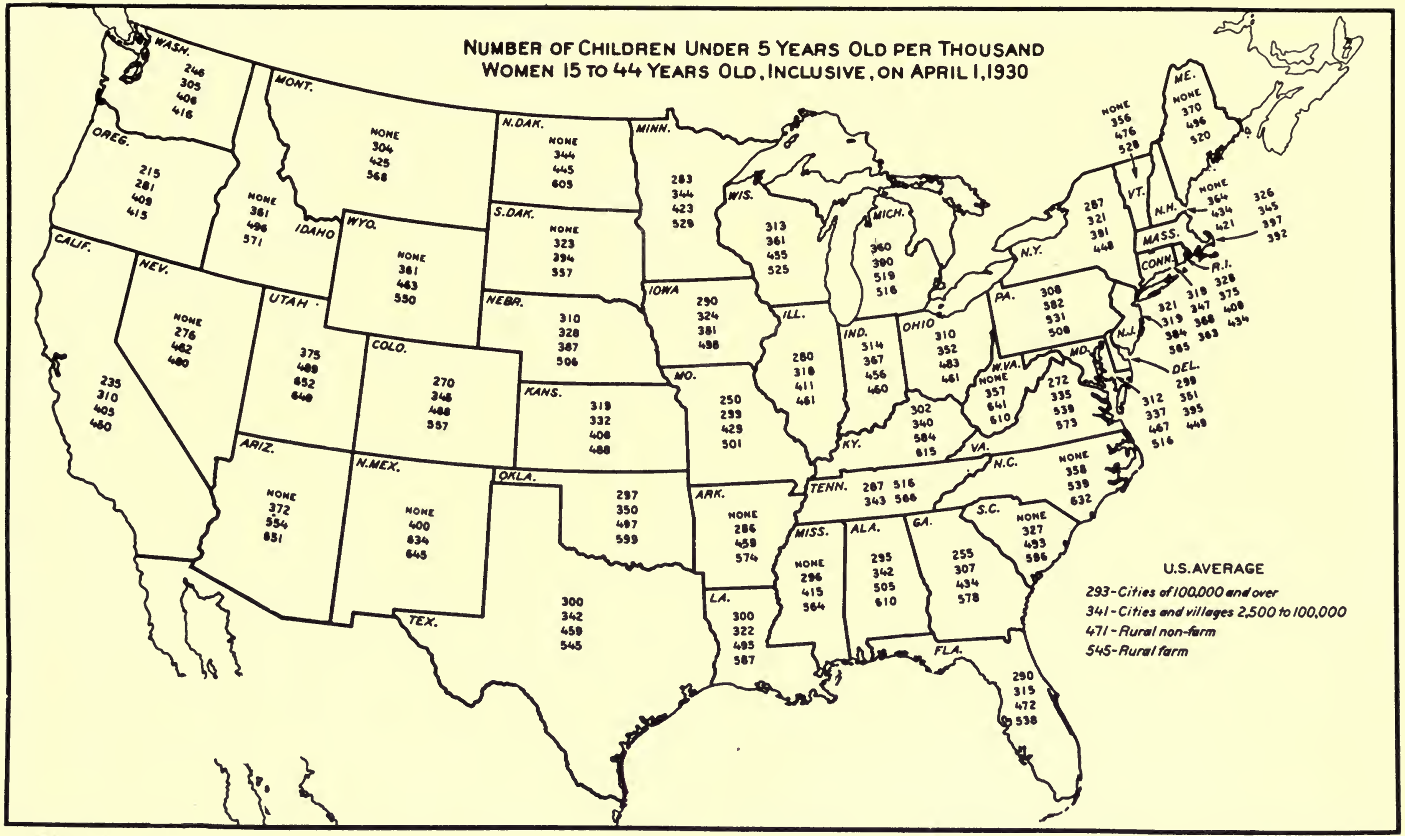
* Based on census data. Values for classes of cities, by size, from Thompson and Whelpton, *Population Trends in the United States*, pp. 279, 290.

TABLE 7

ESTIMATED REPRODUCTION RATES PER GENERATION FOR WHITE POPULATION OF THE UNITED STATES, BY SIZE OF COMMUNITY, DATA OF 1920 and 1930 *

Places	1920 (Replacement Quota: 472)	1930 (Replacement Quota: 443)
Total	1.23	1.09
500,000 and over	.96	.78
250,000–500,000	.83	.76
100,000–250,000	.95	.87
25,000–100,000	1.00	.89
2,500–25,000	1.10	1.00
Rural	1.58	1.47
Total Urban	.99	.87
Urban and rural-nonfarm combined	1.19	1.03
Rural-nonfarm	1.42	1.33
Rural-farm	1.70	1.62

* Ratios of children under 5 per 1,000 females aged 20–44 years (*see* Table 6), combined with replacement quotas derived from *United States Abridged Life Tables, 1919–1920*, and Life Tables for 1930, prepared by the Statistical Bureau, Metropolitan Life Insurance Company.


NUMBER OF CHILDREN UNDER 5 YEARS OLD PER THOUSAND WOMEN 15 TO 44 YEARS OLD, INCLUSIVE, ON APRIL 1, 1930

U.S. AVERAGE
293-Cities of 100,000 and over
341-Cities and villages 2,500 to 100,000
471-Rural non-farm
545-Rural farm

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FIG. 11. EFFECTIVE FERTILITY OF TOTAL POPULATION BY STATES AND BY SIZE OF COMMUNITY, 1930. From Baker, O. E., 1933, "Rural-Urban Migration and the National Welfare," *Annals of the Association of American Geographers*, Vol. 23, p. 73.

Using figures which describe the white population of the United States in the five years preceding the last census (*see* Table 7, last column), we find that each one hundred rural farm women were bearing enough children in the course of their lives to supply 162 women in the next generation, whereas each 100 women in large cities (250,000 inhabitants and over) were producing only about 77 surviving females. The reproduction rate for the farm group thus appears as more than double that for the metropolitan group. In general, reproduction rates decrease with striking consistency as one passes from rural-farm communities through villages and small towns to large cities. The rural-urban differential may truly be characterized as the most conspicuous phenomenon in the demographic situation of the United States at the present time. The extraordinary discrepancy between reproduction rates for farm and city groups found at present is likely to be modified in the near future, but there is no indication that this differential is likely to disappear. Before attempting to estimate probable changes in this situation, and before any effort to evaluate present trends, it is important to give somewhat detailed consideration to the present distribution of population in the United States and to movements now going on among city, village, and country communities.

2. *Distribution Trends*

The total rural-farm population of the United States in 1930 comprised about thirty million people. More than half (16,300,000 persons in 1930) of this total rural-farm population live south of the Mason-Dixon line. Somewhat over one-fourth of the Southern farm people are Negroes (4,600,000). About one-eighth of the Southern rural-farm people live in the Southern Appalachian area (2,120,000), as defined by the Bureau of Agricultural Economics.[3] A majority of the rural-farm population outside the South is divided between the East North Central and West North Central divisions. These two sections (combined) contain about 9,500,000 farm people. There are about 2,200,000 farm people in the Northeast (New England and the Middle Atlantic divisions, combined), and an equal number in the West (Pacific and Mountain divisions, combined).

The distribution of white and colored farm populations, 1925, are shown on density maps, arranged by O. E. Baker of the United States Department of Agriculture, and reproduced here. Mexicans are included with whites in the data used in preparing these maps. One of the conspicuous features of the first map is the density of white farm population in the Southern Appalachian area, where a large proportion of farms are of the "self-sufficing" type.

About 8 per cent of all farms in the United States in 1930 were classified as "self-sufficing," the value of the farm products used by the family being

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[3] The large mining population in this area brings the total, for the year 1930, to 4,977,000 inhabitants in Appalachian counties of Southern states.

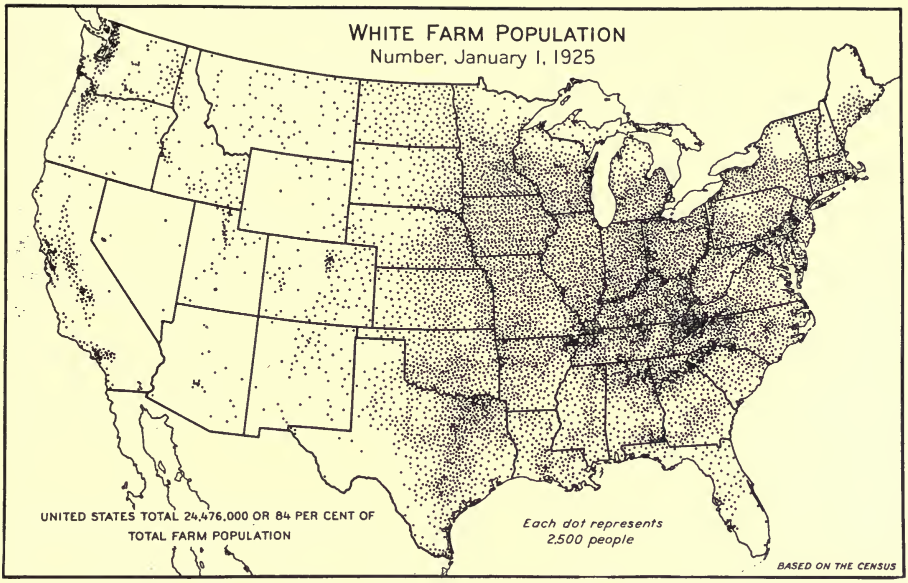
WHITE FARM POPULATION
Number, January 1, 1925
UNITED STATES TOTAL 24,476,000 OR 84 PER CENT OF TOTAL FARM POPULATION
Each dot represents 2,500 people
BASED ON THE CENSUS

FIG. 12. DISTRIBUTION OF WHITE FARM POPULATION OF THE UNITED STATES, JANUARY 1, 1925. From Baker, O. E., 1931, *A Graphic Summary of American Agriculture Based Largely on the Census*, p. 214.

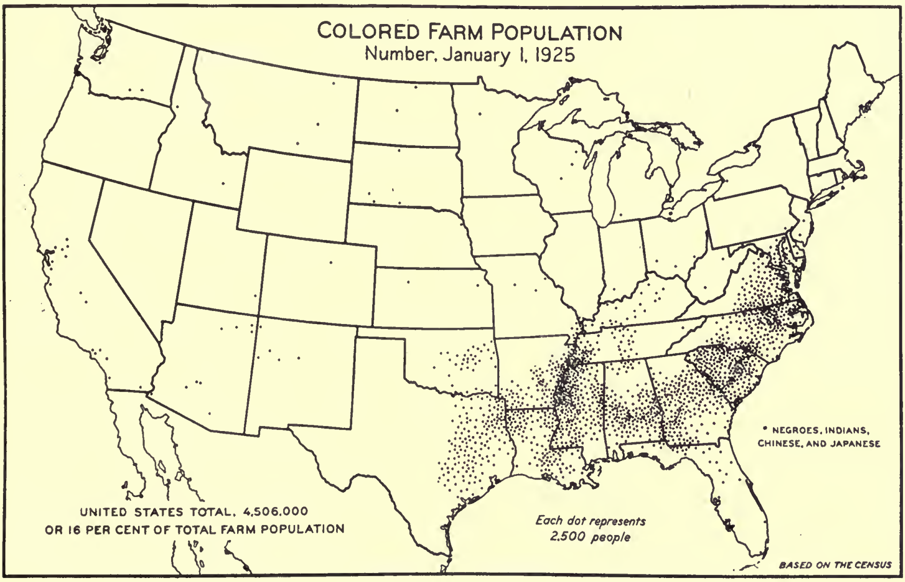
COLORED FARM POPULATION
Number, January 1, 1925
• NEGROES, INDIANS, CHINESE, AND JAPANESE
UNITED STATES TOTAL, 4,506,000 OR 16 PER CENT OF TOTAL FARM POPULATION
Each dot represents 2,500 people
BASED ON THE CENSUS

FIG. 13. DISTRIBUTION OF COLORED FARM POPULATION OF THE UNITED STATES, JANUARY 1, 1925. (Negroes, Indians, Chinese, and Japanese.) From Baker, O. E., 1931, *A Graphic Summary of American Agriculture Based Largely on the Census*, p. 214.

50 per cent or more of the total value of all products of the farm. More than 5 per cent of all farms were described as "part-time," the criterion being that the operator spent 150 days or more at work for pay in jobs not connected with his farm. More than 3 per cent of all farms were unclassified, because the farm had not been operated in 1929, or because information regarding crops was missing or incomplete. In New England, 9 per cent of all farms were classified as "self-sufficing," and 15 per cent were classified as "part-time." The proportion of "self-sufficing" farms in the South Atlantic and South Central states was larger (13 to 14 per cent), but the proportion of "part-time" farms smaller (7 to 5 per cent), than in New England. In the Pacific division more than 10 per cent of the farms are classified as "self-sufficing," and nearly 10 per cent as "part-time." Altogether about one-fourth of all farms in New England, the South Atlantic and South Central, and in the Pacific states were reported as "self-sufficing," "part-time," or "unclassified," in 1930.

Between 1920 and 1930 there was a net increase of total farm population in only 18 states. These 18 states include only three North Central states: North Dakota, South Dakota, and Nebraska; and the increase was practically negligible in the first and last of these. There was an absolute decrease of farm population in the other nine states of the series from Ohio west through Kansas and Nebraska. There was a slight increase of farm population in Massachusetts and Rhode Island.[4] Absolute increase of farm population was also reported during this decade for North Carolina, Mississippi, Louisiana, Texas, several of the Rocky Mountain states, and Washington, Oregon, and California—the largest increase (20.1 per cent) occurring in California. These local increases in farm population can be interpreted as indicating: (1) an increase in the farm population in the Southwest and Pacific states, influenced by the extension of cotton farming, fruit farming, expansion of urban population, and availability of Mexican farm laborers, (2) an increase in the population in the wheat belt, caused by intensification of grain farming on the best lands, as in South Dakota, and (3) an increase of self-sufficing, part-time, and recreational farming. The increase in Massachusetts and Rhode Island and part of the increase in North Carolina and California must be attributed to the last factor.

Since the census-taking of April 1, 1930, there has been a reversal of the usual rural-urban movement of population. The back-to-the-farm movement apparently reached its peak in 1931; but the number of persons leaving farms was even less in 1932 than in 1931, so that the net migration from cities to farms appears higher for 1932 than for 1931. The Bureau of Agricultural Economics estimates that by January 1, 1933, the farm population of the United States reached a new all-time peak of 32,242,000 persons—

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[4] The large apparent increase in rural-farm population in these two states is fictitious due to the change in census classification of rural and urban places. There was, nevertheless, a small increase in total farm population (rural and urban, combined), not affected by the classification of localities in Massachusetts and Rhode Island from 1920 to 1930.

showing an increase of over 2,000,000 persons (about 7 per cent) in less than three years. In 1933 a slight net movement from farms to cities is indicated, but probably not of sufficient magnitude to offset the net annual increase in farm population, due to excess of births over deaths.[5] There can be no doubt that the two or more million people added by the depression to the farm population of the United States have for the most part gone to supplement the "self-sufficing" and "part-time" elements. They have located, in large part, in abandoned farm houses near urban centers, with relatives, or as low-paid farm workers.

The following table, abstracted from a more comprehensive compilation reported by Thompson and Whelpton shows the decennial rate of increase of classes of localities, grouped according to their size at the beginning of the decade 1920–1930.

TABLE 8

PERCENTAGE INCREASE IN POPULATION OF COMMUNITIES OF DIFFERENT SIZES, 1920–1930 *

Places Classified by Size in 1920	Percentage Increase, 1920–1930
All places	16.1
1,000,000 or over	24.0
500,000–1,000,000	21.8
250,000–500,000	15.4
100,000–250,000	20.2
25,000–100,000	24.6
10,000–25,000	24.9
2,500–10,000	26.0
Rural places	8.7
Total farm population	−3.7

* Abstracted from Thompson and Whelpton, 1933a, *Population Trends in the United States*, p. 26. Change in total farm population added from Census data.

The growth in urban places of different sizes appears to have been more uniform than might have been expected, with the greatest proportional increases in great cities with over a million inhabitants and small places with 2,500–25,000 population. There was, however, as might be expected, a great variation in the rates of growth of the smaller places, one-fifth of those under 10,000 population declining in numbers during the decade. In general, there was a more rapid growth in cities of moderate size in the South than in cities of similar size in the North. The population of all rural places increased, but at much lower rates than that of places classified as urban in 1920. There was, however, an absolute decrease in the number of people living on farms. Thus the total nonfarm population of villages classified as rural in 1920 must have increased by about 12 per cent.

The magnitude of metropolitan aggregates in the United States is obscured in an analysis of population by civil divisions because these functional units usually lack corresponding political organization. But attention has been given by the Bureau of the Census to the study of these aggregates, with a recent special publication on *Metropolitan Districts.* This development is also reviewed and interpreted in two Recent Social Trends Monographs, *Recent Population Trends in the United States,* by Thompson and Whelpton, and *The Metropolitan Community,* by McKensie.

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[5] *See* "Farm Population, January, 1934," released by the Bureau of Agricultural Economics March 28, 1934.

A "metropolitan district" for the Fifteenth Census is defined as an area including a central city or cities and contiguous civil divisions each having a density of 150 inhabitants or more per square mile, together with districts immediately contiguous to the central cities or surrounded by civil divisions of the required density, the aggregate population of the district amounting to 100,000 or more, including one or more central cities of 50,000 inhabitants or more. There were 96 such districts in the United States in 1930. Together they cover only 1.2 per cent of the total land area, but they include nearly 45 per cent of the total population. Their location and size are represented graphically on a map, prepared by the Bureau of the Census (*see* Figure 14).

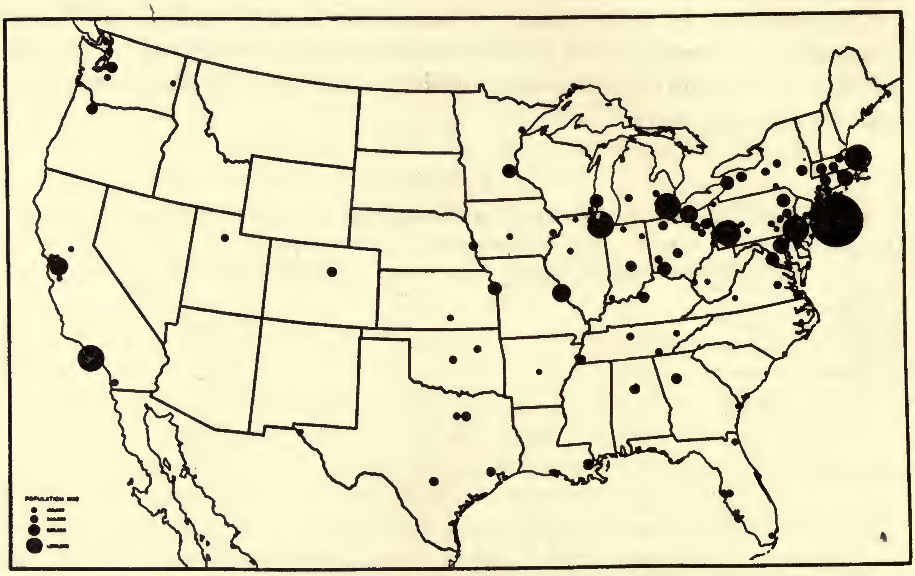

FIG. 14. METROPOLITAN DISTRICTS OF THE UNITED STATES. From *Fifteenth Census of the United States, 1930, Metropolitan Districts,* p. 4. The place names, which would not be legible in this reproduction, have been deleted. The circles in the key (lower left) represent district populations of four sizes: 100,000, 250,000, 500,000, and 1,000,000, respectively.

Very different rates of growth have characterized places of similar size within and outside these metropolitan districts in recent years, especially in the case of small communities. Such differences are shown in the accompanying table. The metropolitan districts represented in this table are the districts so defined on the basis of 1930 census data.

TABLE 9

Rate of Increase of Places of Different Sizes within and outside Metropolitan Districts, 1920–1930 *

Places Classified by Size in 1920	Within 96 Metropolitan Districts	Outside Metropolitan Districts [a]
Central cities in metropolitan districts	22.3	
Other cities [a]	36.2	19.4
100,000–250,000	12.5	—
50,000–100,000	20.5	11.0
25,000–50,000	32.8	20.7
15,000–25,000	26.6	23.0
10,000–15,000	39.6	20.5
5,000–10,000	47.7	19.6
2,500–5,000	69.8	16.9
Rural places	54.8	3.7

* Abstracted from Thompson and Whelpton, 1933, *Population Trends in the United States*, p. 30.

[a] Omitting 247 civil divisions with specified distances from center of metropolitan districts but not included in the district as defined above. The population in cities in these "contiguous areas" increased 15.0 per cent and in rural places 20.9 per cent during the decade.

In general, the central cities in 96 metropolitan areas increased somewhat more rapidly during the last decade (22.3 per cent) than the total population of the United States (16.1 per cent), but the population of all places within these metropolitan areas but outside of the central cities increased nearly twice as rapidly (44.0 per cent) as the population of the central cities. It is thus apparent that there has recently been a powerful tendency at work toward the concentration of population in great metropolitan aggregates, along with a centrifugal tendency within such aggregates toward the scattering of population away from the commercial center into outlying industrial, residential, and distributing units.

The development of suburban communities in metropolitan areas and the increase of village industries and of "self-sufficing" and "part-time" farms, already in evidence during the last decade, have been stimulated by recent economic conditions and encouraged by governmental policy. It seems likely that these "rurban communities," as they have been called, may be characterized by reproduction trends intermediate between the tendencies now found in compact cities and in open country. The rôle of village groups in our future national life may be very important; but it is extremely difficult at present to appraise their true significance.

A small part of the apparent difference in fertility rates between rural and urban areas is really fictitious, due to the migration to cities of persons who would have remained childless even if they had stayed in the country. A detailed examination of data bearing on this topic, however, indicates that this consideration only explains a relatively small part of the present rural-urban differential in reproduction rates (*see* Appendix G).

3. *Conclusions*

There is at the present time a tremendous rural-urban differential in reproductive tendency. This differential may be thought of as composed of two factors, local variations among adjacent communities in the same region, and regional variations between different parts of the country. The latter of these two factors may be greatly modified in the course of the next half-century, although it is not likely to disappear altogether. The former of these factors may be rooted in fundamental differences between ways of living characteristic of rural people and ways of living characteristic of city people.[6] In the language of the sociologist, the rural-urban differential as regards reproduction is in part a phenomenon of "cultural diffusion," due to the more rapid spread of the practice of family limitation in some localities than in others; but in part it is an "ecological" phenomenon, due to differences in ways of living adapted to radically different situations. There is likely to be some narrowing of the extreme differentials now found among various types of communities; but the rural-urban differential in fertility and in reproduction is likely to remain something to conjure with for many years to come. The intermediate fertility rates characteristic of village groups (rural-nonfarm and small city populations) may come to have increasing importance as a stabilizing force in future population trends in this country.

The present large rural-urban differential in reproduction rates necessarily involves a constant tendency towards the accumulation of surplus population in agricultural areas. There were 2,665,000 white children and 589,000 Negro children under 5 years of age on rural farms in the United States in 1930, making no allowance for under-enumeration. On the basis of ratios and quotas cited above, we may estimate that in the case of the whites 61.7 per cent of these children would be sufficient to replace the adult population from which they are derived, leaving an excess of 38.3 per cent, or slightly over one million white children under 5 years of age. Similarly, we may assume that among the Negro children there were some two hundred thousand children, more or less, in excess of the number needed for replacement. These figures indicate a surplus of some 1,200,000 children accumulated in the rural-farm population, above replacement needs, during the five-year period, 1925–1929. Such disproportionate accumulation of rural-farm population is likely to continue indefinitely, although to a reduced degree. This situation can only be compensated by a constant stream of young migrants from farms to cities as they reach ages of economic productivity. At times of economic disturbance this population movement is likely to be dammed up. In any case, the inertia involved in change of residence tends to cause a further imbalance between agricultural and industrial production—to say nothing of the current desire to reduce agricultural productivity in relation to industrial productivity.

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[6] This topic will be considered in more detail in Chapter X.

Thompson and Whelpton have commented on one phase of the immediate situation, as follows (1933a, p. 21):

> "If prosperity again permits a resumption of the movement of the surplus farm population to city jobs, the present urban exodus may do little permanent harm. If this should not occur, there is danger of developing a large poverty-stricken population on the millions of acres of land which is submarginal for business farming, but which will permit self-sustaining farming on a low standard of living."

Again, the higher proportion of children, who are necessarily dependent on their elders for support, in rural communities and in areas of retarded economic development, places additional economic burden on the parents and tax-payers in these sections. If country children were to receive educational advantages equal to those enjoyed by the average city child, the tax burden for educational purposes would have to be at least 50 per cent higher at present for the average rural adult than for the average city dweller.

A moderate rural-urban differential is to be expected and may be entirely wholesome, but such extreme differentials as are now found between different sections of the population of the United States tend to cause serious economic disturbances. This is most especially the case because the highest fertility is now found among large rural groups whose economic status is already that of a poor peasant class. Some decrease in the extreme differentials in fertility now found among different types of communities may then be immediately suggested as one principle that should be included, merely on economic grounds, in any comprehensive national population policy.

CHAPTER III

REPRODUCTION TRENDS AMONG GROUPS CLASSIFIED BY RACE, NATIVITY, OR NATIONAL ORIGIN

1. *Present Racial Composition of the United States*

The white population of the United States, exclusive of Mexicans, constituted 89.0 per cent of the total in 1920, and 88.7 per cent in 1930.[1] The slight decrease in the proportion of white persons thus indicated is due chiefly to increase in the Mexican population.

Great Britain and Northern Ireland have been the immediate source (combining figures for descendants of Colonial stock, descendants of immigrants arriving after the Revolutionary War, and immigrants now living) of 41.4 per cent of the total white population of the United States in 1920—according to the committee appointed to determine immigration quotas. If persons of English descent but born in non-quota countries (chiefly Canada) had been included, this figure would have been raised three or four points, to about 45 per cent. Ireland, as represented by the Irish Free State, is officially estimated to have contributed directly 11.2 per cent, Germany, 16.3 per cent, and the Netherlands, 2.0 per cent of our total white population. It is therefore evident that the four nationality groups which predominated in the American Colonies before the Revolutionary War have directly supplied more than 70 per cent and indirectly about 75 per cent of the present white population of the United States. Moreover, these countries are assigned shares in the total allotment of immigrants from all quota countries in proportion to their direct contribution, according to the "national origins" plan, which came into effect in 1929. This plan provides for a theoretical limit of about 150,000 immigrants per year, or 1,500,000 immigrants per decade from all quota countries. With a population of about 150,000,000 persons, which may be expected in a few decades, this figure would represent an increase of only one per cent per decade.

Poland has contributed slightly over 4 per cent, Italy somewhat less than 4 per cent, and Norway and Sweden combined, somewhat less than 4 per cent of our present white population, according to the official estimate. France, Czechoslovakia, and Russia have each contributed directly somewhat less than 2 per cent of the same total.

Persons reporting Hebrew or Yiddish as their native language made up 56.5 per cent of the immigrants from Russia who were resident in the United States in 1920 (Carpenter, 1927, p. 342). The corresponding proportions of Hebrews among the foreign born from other European countries ran as follows: Rumania, 36.3 per cent; Austria, 17.2 per cent; Poland, 10.0 per cent; Turkey in Europe, 5.0 per cent; Hungary, 4.3 per cent; Lithuania, 3.7 per cent; England, 1.2 per cent; and Germany, 0.2 per cent. The figure for Germany is probably least significant, as many German Jews probably reported "German" as their mother tongue. In many cases, too, persons who were Jewish in family background came from homes using the language of the country in which they resided. A canvass of the number and distribution of Jews in the United States, conducted in 1927 by the American Jewish Committee, yielded an estimate of 4,228,000 Jews in the country, comprising 3.58 per cent of the entire population (Linfield, 1929). It was estimated that Jews make up 5 per cent of the people living in Northeastern states (including Maryland, Delaware, and the District of Columbia, and extending far enough to the west to include Kansas, Nebraska, and the Dakotas), about one-half of one per cent of the people in Southern states, and about one and a half per cent of those in Western states. Jews make up 16.7 per cent of the population of the State of New York and 29.6 per cent of the population of New York City. They constitute 11 per cent of the total population of all large cities (100,000 or over) in the United States, according to this estimate.

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[1] *See* Appendix H. *See also* Figure 15.

The indirect French influence on American population through Canada has added another 1 per cent, more or less, to our white population. This influence will probably be gradually increased in the future unless the quota system is applied to the entire continent of North America. French Canadians made up 3.7 per cent of all foreign-born white persons resident in the United States in 1930 who were reported as having entered this country during the preceding five years. In 1930, French Canadians constituted 14 per cent of the total foreign-born population in New England.

Negroes constituted about one-tenth (9.7 per cent) of the total population of the United States in 1930. This percentage is about half that of Negroes in the total population at the time of the first Census (19.3 per cent, 1790), and little more than two-thirds the corresponding proportion on the eve of the Civil War (14.1 per cent, 1860). The comparison of recent reproduction trends among whites and Negroes is a rather complicated problem which must be reserved for later consideration.

The Mexican population of the United States increased from about 700,000 in 1920 to over 1,400,000 in 1930, as estimated by the Bureau of the Census.[2] The increase indicated by these figures amounts to nearly one-half of the theoretical limit per decade allowed for all European countries combined, under the quota system now in force. Part of the increase in Mexican population is due to a high rate of natural increase. Mexicans, in 1930, constituted a larger proportion (1.2 per cent) of the total population of the United States than the American Indian, Chinese, Japanese, and Filipino groups combined (0.5 per cent). The figures for these smaller racial groups in 1930 were: Indian, 332,000; Chinese, 75,000; Japanese, 139,000, and Filipino, 45,000. There is also an apparent trend toward rapid natural increase among Japanese and Chinese resident in this country. In fact, from 1920 to 1930, in spite of the exclusion of immigrants from the Orient, the Japanese group increased from 111,000 to 139,000 persons and the Chinese group from 63,000 to 75,000 persons. There has been a decline in the ratio of males to females in both races, so that they are becoming normal, self-perpetuating groups.

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[2] "This estimate is based on the assumption that the ratio between white persons of Mexican birth or parentage and persons who should be classed as 'Mexican' (i.e., 'not definitely white, Negro, Indian, Chinese, or Japanese' according to census instruction) was the same in 1920 as in 1930." U. S. Bureau of the Census, *Fifteenth Census, 1930, Population Bulletin, Second Series, United States Summary*, p. 7.

In 1930, the "foreign white stock" (foreign-born white persons and natives of foreign or mixed parentage) included 123,000 persons born in Cuba, the West Indies, Central and South America; and the "native white stock" included 136,000 persons born in outlying possessions, including Puerto Rico—but excluding 45,000 Filipinos, who were separately enumerated. Some of these peoples form groups that are socially intermediate between whites and Negroes in metropolitan centers along the Atlantic and Pacific seaboards.

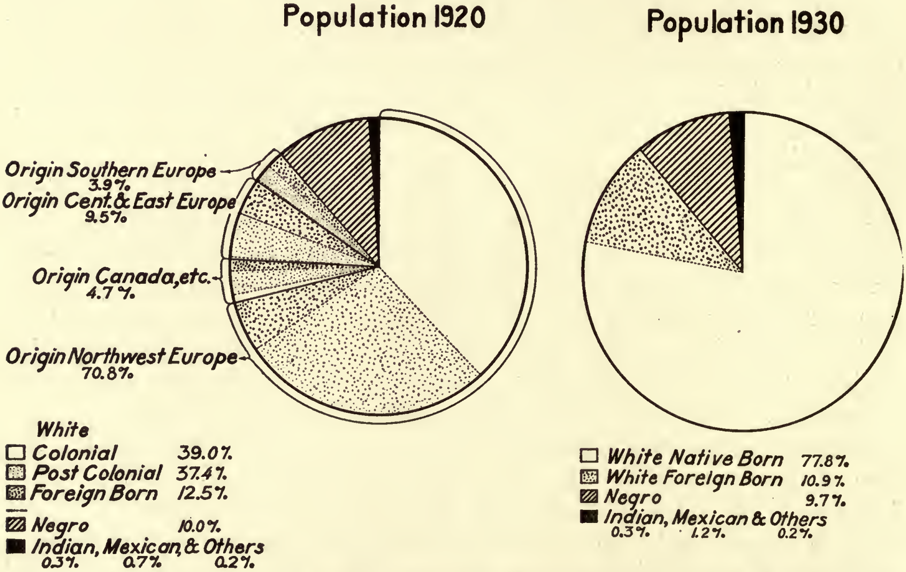

FIG. 15. DISTRIBUTION OF THE POPULATION OF THE UNITED STATES BY RACE, NATIVITY, AND NATIONAL ORIGIN, 1920, 1930. Data and sources in Appendix H.

Census data on mulattoes in the total Negro population are of little value, because based entirely on the subjective impressions of census enumerators. Furthermore, instructions on this matter have varied in different periods. In 1860, 10.4 per cent of all slaves, 40.8 per cent of the free Negroes in slave states, and 30.9 per cent of the free Negroes in free states were reported as mulattoes. At that time free Negroes constituted about 11 per cent of the total colored group; somewhat less than one-half of these free Negroes were living in Northern states.[3] In 1910, 20.9 per cent of the Negroes in the United States were reported as mulattoes, but in 1920 only 15.9 per cent were so reported.

The first attempt at complete enumeration of Indians was made in 1890, when 248 thousand were counted. In 1910, about 266 thousand were reported. There was an apparent decrease of 21 thousand between 1910 and 1920, and an apparent increase of nearly 88 thousand between 1920 and 1930, to a total of 332 thousand. These fluctuations in figures for the Indian population (including persons of mixed white and Indian ancestry) probably represent, in large part, differences in census procedure rather than sudden changes in population trend.[4] The Indian population at present is apparently characterized by fairly rapid natural increase. It does not appear to be dying out—although many mixed-bloods have been and are being gradually assimilated into white and Negro groups.

2. *Variations in Fertility and Reproduction among Racial Groups*

Variations in fertility among the major race-nativity groups in the United States are shown graphically in Figure 16. Four principal features of recent trends in fertility among these three race-nativity groups may be noted at once.

1. The most rapid decline in fertility during the last decade is found in the case of foreign-born whites. The change in age-specific rates for this group may be attributed chiefly to the rapid assimilation of immigrant groups with foreign, rural background to current ways of living in American cities, but perhaps in part to changes in sources and types of immigrants since the time of the War. Increased average age within each age class also tends to exaggerate the decrease in specific fertility rates for foreign-born women by five-year age classes.
2. Present levels and recent changes in age-specific fertility rates are, in general, fairly similar for native whites and for Negroes.
3. Decline in age-specific fertility rates both for native white women and for Negro women is limited to ages over 20 years. The decline in fertility from 1920 to 1929 was negligible in the case of native white or Negro women aged 15–19 years.
4. Age-specific fertility rates for Negro women reach a peak at 20–24 years and decline rapidly thereafter.

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[3] It may be of some incidental interest to note that according to census statistics the slave population increased somewhat more rapidly than the free Negro population between 1820 and 1860.

[4] The inclusion on the census schedules for 1910 and for 1930 of special questions regarding Indians, which were not included for 1920, may have caused an increase in the number of persons with Indian ancestry who were explicitly so reported in 1910 and in 1930.

Most of the minor racial groups in the United States appear to be very prolific, as indicated by ratios of children to women of childbearing age. It must, of course, be borne in mind that most of the women in these minor racial groups are brought to this country as wives. It is also probable that death rates in the United States are higher for all of these minor racial groups than for whites. Nevertheless, it is apparent that all the groups, other than white and Negro, represented in the table on page 43, although very small, are tending at present toward rapid natural increase.

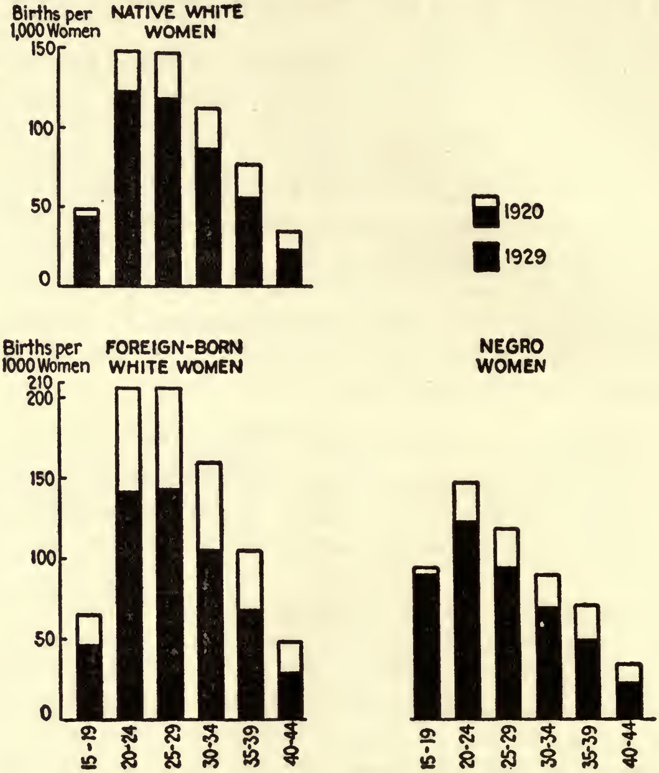

FIG. 16. SPECIFIC FERTILITY RATES FOR NATIVE WHITES, FOREIGN-BORN WHITES, AND NEGROES, IN BIRTH REGISTRATION STATES, 1920 AND 1929. From Thompson and Whelpton, 1933a, *Population Trends in the United States*, p. 269. Age-specific fertility rates for native white, foreign-born white, and Negro women at the beginning and at the end of the last decade (for the 1919 birth registration area) are represented by upright bars—the 1920 rates in outline, the 1929 rates in solid black. The values here represented, it should be noted, are based on registration and census data used at face value without adjustments for incomplete registration of births or under-enumeration.

Several different approaches are possible in making comparative studies of the reproduction trends of whites and Negroes. The use of census data for successive periods, with adjustments for increases by immigration, is the most obvious and direct method. But even in this procedure we are hampered by irregularities in the data. The Bureau of the Census has

TABLE 10

Children under 5 Years per 1,000 Women Aged 20–44 Years for Different Races in the United States, According to 1930 Census Data

	Women Aged 20–44 Years	Children Aged 0–4 Years	Children per 1,000 Women
White	20,654,795	9,927,396	481
Negro	2,477,003	1,230,206	497
Mexican	237,161	214,773	906
Indian	50,533	46,680	924
Chinese	5,502	5,781	1,051
Japanese	21,478	17,696	824
Filipino	1,305	1,423	1,090

published the following estimate of adjustments to be made in the use of recent data on the Negro population:

> "The rate of increase in the Negro population has also shown a downward trend since 1810, but the rates, even with adjustment for 1870, show fluctuations which are difficult to explain. For example, the rate of increase dropped from 22.0 per cent (adjusted) in the decade 1870 to 1880 to 13.5 per cent between 1880 and 1890, and then rose to 18.0 per cent in the following decade.
>
> "In the face of this fluctuation in the decennial rate of increase, the Census Bureau has admitted the possibility of an undercount of Negroes in 1890. A similar fluctuation in the rate of increase was that from 11.2 between 1900 and 1910 to 6.5 in the decade 1910 to 1920, followed by a rate of 13.6 between 1920 and 1930. This fluctuation is even greater than that of 30 years earlier, and suggests the probability of an undercount of Negroes in 1920, as well as in 1890. It would be a mistake, however, to assume that the entire fluctuation in the latter period was due to an undercount. The decade 1910 to 1920 included the years of the World War, with its consequent disorganization of the Negro population through military service and labor migrations, and also the influenza epidemic of 1918 and 1919. The disorganization of the War and migration period would tend to decrease births, and the epidemic probably increased the number of deaths of Negroes within the decade by at least 100,000. The number of deaths in the decade 1910 to 1919 of Negroes living at the census of 1910, on the assumption that the death rate of Negroes in the registration area was typical of that for Negroes in the United States as a whole, was 1,754,956, as compared with 1,522,665 Negro deaths similarly calculated for the decade 1920 to 1929 in the population living at the census of 1920. A comparison by five-year age periods of the Negro population in 1910, 1920, and 1930, arranging these periods by groups of birth years and allowing for calculated deaths in each birth-year group, would indicate a shortage of about 150,000 in the Negro enumeration of 1920, as compared with the enumerations of 1910 and 1930. This shortage in the enumeration is in addition to the usual shortage of perhaps 100,000 in the enumeration of Negro children under 5 years old. This latter shortage can be shown for every census by comparing the number of children under 5 with the number 10 to 14 in the following census, taking into account deaths within the 10-year period" (*Fifteenth Census*, *Population*, Vol. 2, p. 26).

Other authorities, however, have made quite different estimates. Woofter has estimated that the relative under-enumeration of Negroes in 1920 may have been as high as 450,000, on the assumption that the rate of decline in the annual rate of natural increase was fairly constant during the last two decades (pp. 461–462).

It is perhaps hazardous to attempt to apportion the increase in the Negro population from 1910 to 1930 separately to the decades 1910–1920 and 1920–1930. In any case, the gross increase during this whole twenty-year period shows an *average* decennial rate of natural increase of 9.4 per cent for the Negro population. The corresponding average decennial rate of natural increase for the white population, exclusive of Mexicans, during this period was 12.9 per cent. It may be, as suggested by the Census authorities, that the reproduction rate of the Negro group did not slow down during this period. If so, the reproduction rates for Negroes and whites would be much closer together at the end than at the beginning of this period. Estimates of percentages of natural increase for whites and Negroes from 1870 to 1930, with alternative possibilities regarding the Negro population during the last twenty years, are given in the following table.

TABLE 11

ESTIMATED PER CENT NATURAL INCREASE BY DECADES FOR WHITE AND NEGRO STOCKS IN THE UNITED STATES, 1870–1930

Inter-census Periods	White[a]	Negro[b]			
			Uncorrected: Total Increase	*Estimated by Woofter: Net Increase*	*Estimated by the Census: Total Increase*
1870–1880	18.9[c]	22.0[e]			
1880–1890	15.2[c]	17.6[e]			
1890–1900	14.6[c]	13.8[e]			
1900–1910	13.0[c]	11.2			
1910–1920	13.5[d]	9.4[f]	6.5	10.2[g]	8.0[e]
1920–1930	12.4[d]		13.6	8.6[g]	12.0[e]

[a] Inclusive of Mexicans, 1870–1910. Exclusive of Mexicans, 1910–1930.

[b] Inclusive of foreign-born Negroes, 1870–1910. Exclusive of foreign-born Negroes, 1910–1930, except census estimates for these decades.

[c] Estimates of natural increase, by Thompson and Whelpton, expressed as percentages of white population at beginning of decade. (1933a, pp. 5, 298, 303.)

[d] Same as *c*, with adjustments to exclude Mexicans, and to yield rates for 10-year periods exactly.

[e] Estimates of rates of inter-census increase for total Negro population, by Bureau of the Census. *Fifteenth Census, Population*, Vol. 2, p. 32.

[f] Geometrical mean natural increase per 10-year period (exactly), to give total increase, April 15, 1910 to April 1, 1930, using Woofter's estimates for net increase by immigration.

[g] Woofter, 1931, pp. 461–462.

We are even more hampered by errors and irregularities of data in any attempt to give an analytical treatment of recent birth and death statistics in order to compute "true" annual rates of natural increase for whites and Negroes. Inaccuracies in vital statistics for Negroes affect both the fertility data and the mortality data on which such derived rates must be based. There is no doubt that death rates for American Negroes have been gradually falling during the last few decades, but whether more slowly or more rapidly than death rates for whites cannot be exactly determined. "The trend in the death rate for Negroes [from 1880 to 1927] is not significantly different from that for white persons in Baltimore and New Orleans, two cities for which fairly accurate records are available." (Sydenstricker, 1933a, p. 157.) The same is true, during recent years, for Negroes and whites in the industrial group of the Metropolitan Life Insurance Company. Apparently, the percentage decrease in death rates for urban Negroes has recently been about the same as the percentage decrease in death rates for urban whites. It is more difficult, however, to make any trustworthy statement about mortality trends among rural groups—because increases in the completeness of registration data tend to conceal true decreases in death rates. In the absence of specific evidence to the contrary, the most likely assumption is that survival values for Negroes, although consistently lower than survival values for whites, have been gradually rising at about the

TABLE 12

ESTIMATED TRUE ANNUAL RATES OF NATURAL INCREASE OF WHITES AND NEGROES IN SELECTED AREAS, 1920 AND 1928 * [a]

Race and Area	True Rate of Natural Increase per 1,000 [b]		
	1920	*1928*	*Change 1920–1928*
Whites in			
Massachusetts, Connecticut, New York	1.9	−4.3	−6.2
Pennsylvania	11.8	4.9	−6.9
Ohio, Indiana, Michigan, Wisconsin	8.6	3.3	−5.3
Minnesota, Nebraska, Kansas	10.1	3.1	−7.0
Virginia, North Carolina, South Carolina, Kentucky	19.7	12.8	−6.9
Washington, Oregon, California	3.2	−0.3	−3.5
9 large cities [c]	0.6	−5.1	−5.7
Negroes in			
5 Southern states [d]	13.0	8.9	−4.1
8 Northern states [e]	−4.8	−1.1	3.7
9 large cities [f]	−12.7	−9.9	2.8

* From Whelpton, 1930, "Population; Trends in Differentials of True Increase and Age Composition," *American Journal of Sociology*, Vol. 35, pp. 870–880, cited by Thompson and Whelpton, 1933, *Population Trends in the United States*, p. 281.

[a] Nearly all areas for which the necessary birth data and life tables are available for 1920 are included. Because adequate life tables are not available for whites and Negroes in these areas in 1928, the rates shown for 1928 are only approximately correct, probably being low rather than high. The same method of estimating survival values was followed throughout, so the error in the 1928 rate of one area should be approximately the same as that of other areas, and the relative standing of the areas should not be affected significantly.

[b] In computing these rates an allowance was added for nonregistered births based on Elbertie Foudray, *United States Abridged Life Tables, 1919–1920*, pp. 58–60.

[c] Baltimore, Boston, Cleveland, Detroit, New York, Philadelphia, Pittsburgh, San Francisco, Washington, D. C.

[d] Kentucky, Maryland, North Carolina, South Carolina, Virginia.

[e] Connecticut, Indiana, Kansas, Massachusetts, Michigan, New York, Ohio, Pennsylvania.

[f] Baltimore, Boston, Chicago, Cleveland, Detroit, New York, Philadelphia, Pittsburgh, Washington, D. C.

same rate during the last decade. Estimates of birth rates for Negroes are even more uncertain than estimates of death rates, because of very great irregularities in the registration of Negro births. Estimates sponsored by Thompson and Whelpton for true rates of natural increase in 1920 and in 1928 are shown in Table 12.

More extensive data, with somewhat more exact control, are available for estimating reproduction trends among Negroes on the basis of ratios of children to women and corresponding replacement quotas. The fact that the influence of variations in infant mortality is for the most part automatically eliminated in this process reduces the chances for error. And it is possible to make an adjustment for under-enumeration of children that is somewhat more satisfactory than any adjustment possible for under-registration of births. The results indicated by this procedure are shown in Table 13, with relative values for whites and Negroes in Tables 14 and 15.

TABLE 13

Children under 5 Years per 1,000 Women Aged 20–44 Years for Whites and Negroes in Urban, Rural-Nonfarm, and Rural-Farm Groups, 1920, 1930. Uncorrected Ratios

	1920		1930		Rates for 1930 as per Cent of Rates for 1920	
	White	*Negro*	*White*	*Negro*	*White*	*Negro*
Total	581	546	481	497	83	91
Urban	471	293	384	319	82	109
Rural-nonfarm	669	548	588	543	88	99
Rural-farm	802	826	718	794	90	96
Total *except* rural-farm	563	364	457	370	81	102
Ratio of rates for rural-farm to rates for total *except* rural-farm	1.42	2.27	1.57	2.15		

Two opposite tendencies apparently affect recent trends in the fertility of American Negroes, relative to the fertility of the white population. On the one hand, the large movement of Negroes from farming communities to cities has undoubtedly tended to lower fertility rates. On the other hand, fertility rates for Negroes have apparently not been falling so rapidly as fertility rates for whites, either in rural places or in cities—even after considerable allowance is made for more accurate enumeration of Negro children under five years of age in 1930 than in 1920. In fact, fertility rates for urban Negro women appeared, prior to the depression, to be rising, abso-

TABLE 14

EFFECTIVE FERTILITY OF NEGROES AS PER CENT OF EFFECTIVE FERTILITY OF WHITES, 1920, 1930

	1920		1930		
	Uncorrected	Adjusted [a]	Uncorrected	Adjusted [a]	
				Method A	Method B
Total	94	104	103	114	109
Urban	62	69	83	92	88
Rural-nonfarm	82	91	92	102	97
Rural-farm	103	114	111	122	116
Total, *except* rural-farm	65	72	81	90	85

[a] Adjusted for estimated amounts of under-enumeration of children under 5 years in different races: with adjustment values 1.156 (Method A) and 1.10 (Method B). *See* Appendix A, Table 4, and context. In Method A it is assumed that under-enumeration of Negro children under 5 years, relative to Negroes at other ages, was the same in 1930 as in 1920. In Method B it is assumed that relative under-enumeration of Negro children in 1930 was intermediate between relative under-enumeration of white children and relative under-enumeration of Negro children in 1920.

TABLE 15

ESTIMATED NET REPRODUCTIVE RATE OF NEGROES AS PER CENT OF CORRESPONDING NET REPRODUCTIVE RATE FOR WHITES, 1920, 1930 [a]

	1920	1930	
	Adjusted [b]	Adjusted Method A [b]	Adjusted Method B [b]
Total	90	98	94
Urban	59	79	75
Rural-nonfarm	78	88	84
Rural-farm	98	105	100
Total, *except* rural-farm	62	77	73

[a] Based on assumption that the permanent replacement quota for urban Negroes remains 17 per cent higher than quota for whites during this period, and that the permanent replacement quota for rural Negroes remains 16 per cent higher than for whites. Estimates based on life table values for 1919–1920, according to *United States Abridged Life Tables, 1919–1920.*

[b] Adjustments for under-enumeration as in previous table.

lutely—as industrial opportunities supplied the economic basis for more normal family living for Negroes in cities, or perhaps we should say rather, as larger numbers of Negroes with rural background moved into urban localities. The comparatively slow decline in fertility rates for Negroes in the rural South is probably due to a wholly different cause, and is associated with the slow tempo of all social changes in this group.

Taking all these items into account, it appears likely that the reproduction rate of the Negro group as a whole is still slightly below that of the white group as a whole; but any difference in reproduction rates that may now exist between the two groups must be very small, and it may quite disappear or be reversed in character in the near future. There are, however, so many uncertain elements in the situation that prediction of future population trends for Negroes in this country would be very hazardous.

The net reproduction tendency of mulatto families in Southern communities has been shown by Frazier, using census data for 1910 and 1920, to have been slightly higher than that of black families living in the same localities, with some exceptions. Little difference is indicated between these sub-groups in average number of children born per fertile couple; but the black families, especially in cities, appear to be characterized by a somewhat higher proportion of childlessness and by a distinctly higher rate of child mortality. The mulattoes were shown to be superior in average social status to blacks living in the same communities, as evidenced by illiteracy rates and home-ownership rates. The slightly higher reproduction rates for mulattoes, compared with blacks, indicated by this study, may therefore be attributed to the influence of high disease rates and serious family disorganization in colored families with very low social status. For example, in Nashville, in 1910, 60 per cent of the children born in mulatto families were reported as living at the time of the census, but only 53 per cent of the children born in black families. Similar results are indicated for Birmingham, Charleston, and several rural areas. Again, in Nashville, in 1910, we find an average of 2.0 living children per mulatto family, in contrast to an average of 1.7 living children in black families; similar differences appear in the statistics for Birmingham and Charleston, in 1910; and similar differences (except in the case of Birmingham, affected by extensive migratory movements during the war period) appear again in 1920. Apparently we here encounter one of the interesting reversals of the usual negative relationship between social status and reproductive tendency. On the other hand the rural-urban differential within the Negro group, as within the white group, is much greater than any small difference in reproduction trends that may exist at present between the Negro population as a whole and the white population as a whole.

3. *The Trend of Fertility in Immigrant Stocks*

Much less interest attaches now than formerly to comparisons between fertility rates for foreign-born women and the fertility rates for native women—both because the foreign-born group among women of childbearing age is diminishing in numerical importance, and because the difference in fertility between foreign-born and native women has been constantly narrowed during recent years. According to the estimates of Thompson and Whelpton, the standardized fertility rate per year for foreign-born women aged 15–44 years decreased 32 per cent from 1920 to 1929, while that for native white women decreased 20 per cent, so that the standardized fertility rate for foreign-born women, which was 41 per cent above that for native white women in 1920, was only 18 per cent higher in 1929 (Thompson and Whelpton, 1933a, p. 276). And, according to data presented in the previous chapter, the effective fertility of all foreign-born women in the United States was only 2 per cent higher, according to 1930 data, than the effective fertility of all native white women (*see* Table 6). But this result is somewhat influenced by the preponderance at present of older women in the case of the foreign-born in the age class, 20–44 years. Moreover, when separate analysis is made for urban and for rural regions, the effective fertility of the foreign-born women appears as over 25 per cent higher than that of the native women in urban places, 3 per cent higher in the rural-nonfarm population, and 8 per cent higher in the rural-farm population.

It is quite certain that, in view of their concentration in urban areas, native whites of foreign and mixed parentage have a lower average fertility rate at present than native whites of native parentage, for the United States as a whole. It is possible, however, but by no means certain, that native whites of foreign and mixed parentage may have, on the average, somewhat higher fertility rates than native whites of native parentage in the same localities. It is difficult to obtain any satisfactory data on this subject. The 1930 census data on size of family throw some light on this situation, although size of family is not an accurate index of fertility. The median size of all families in the United States in 1930 in cases where the head was native white of native parentage was 3.37, and in cases where the head was native white of foreign or mixed parentage, 3.28, but in cases where the head was foreign born, 3.74. Limiting the computation to urban families only, the median size of family drops to 3.13 for native white of native parentage, and to 3.19 for native white of foreign parentage, whereas the figure for the foreign-born is not changed significantly from that for all families with foreign-born heads in the United States. In the rural-nonfarm population the median size of family is again somewhat less for the native white of native parentage than for the native white of foreign or mixed parentage. But in the rural-farm population the median size of family is greater for the native white of native parentage than for the native white of foreign or mixed parentage.

Unfortunately, there is even less recent, reliable evidence on the fertility of native white women derived from particular European stocks. In fact, the only extensive investigation of the subject ever made in this country is that by Hill, based on 1900 census data, which appeared in a report of the United States Immigration Commission in 1910. This study is based on census data for selected areas with large foreign elements: Rhode Island, Cleveland, 48 mainly rural counties of Ohio, Minneapolis, and 21 mainly rural counties of Minnesota (*see* Table 16).

It appears that prior to 1900 high fertility rates were characteristic of second generation groups from non-English-speaking countries, in contrast to comparatively low rates for groups originating in the British Isles and English Canada. Among the British stocks, the groups originating in the more rural areas, Ireland, Wales, and Canada, show distinctly higher rates

TABLE 16

NUMBERS OF CHILDREN EVER BORN TO WOMEN MARRIED 10–19 YEARS AND UNDER 45 YEARS OF AGE, CLASSIFIED BY RACE, NATIVITY, AND NATIONAL ORIGIN, 1900 *

Race, Nativity, and National Origin	Number of Wives	Average Number of Years Married	Per Cent with No Children	Average Number of Children per Wife
All classes	78,432	14.1	7.4	4.1
Native white of native parentage	15,953	14.2	13.1	2.7
Native white of foreign parentage	24,028	14.1	6.3	3.9
Foreign-born white	37,788	14.2	5.3	4.7
Negro	633	13.9	20.5	3.1
Native white of foreign parentage by country of origin [a]				
Bohemian	354	13.1	2.8	4.4
Canadian-English	297	13.5	8.4	3.3
Canadian-French	526	13.8	4.4	4.9
English	1,777	14.2	10.3	2.9
French	234	14.3	9.0	4.2
German	12,800	14.1	5.4	3.9
Irish	5,483	14.1	8.1	4.2
Norwegian	886	13.7	2.8	4.6
Scotch	310	13.9	11.3	2.9
Swedish	265	13.2	6.4	3.6
Swiss	418	14.2	5.0	4.1
Welsh	371	13.8	4.6	3.4

* Abridged from Hill, 1913, "Comparative Fecundity of Women of Native and Foreign Parentage in the United States," *Quarterly Publications of the American Statistical Association*, Vol. 13, pp. 599–600.

[a] Groups with 100 or more women in sample, only.

than those originating in England and Scotland. The Catholic groups, Canadian-French, French, and Irish, show higher fertility rates than the Germans or Swedes, although not so high as the Norwegians, a predominantly rural group—in spite of the fact that the Irish were largely located in urban places in New England. The highest fertility rate for any group in this series is that for the French Canadians, a group of rural and orthodox Catholic origin, which suffered little cultural change at first in drifting across the Canadian border into New England towns.

More recent data are available for ethnic groups in Canada. Persistent differences are there apparent between French and English stocks. These differences appear not only in comparisons between French and English provinces, but also between French and English families living in the same locality, as for example, in the Prairie Provinces.

It is at first rather surprising to find such conspicuous fertility in an American group, the Canadian French, which is derived from the particular European stock which is most widely regarded as peculiarly infertile. But

TABLE 17

STANDARDIZED BIRTH RATES PER 1,000 WOMEN AGED 15–49 OF BRITISH AND OF FRENCH ORIGIN, WITH DATA ON NATIVITY, RESIDENCE, AND LITERACY, PRAIRIE PROVINCES, CANADA, 1920 *

	Standardized Birth Rate per 1,000 Women, Aged 15–49	Per Cent of Total Population Born in North America	Per Cent of Women over 21 Living in Rural Localities	Per Cent of Women over 10 Reported as Illiterate
British	82	70	47	0.3
French	124	86	64	4.7
Ratio of values for French to values for British	1.51	1.23	1.36	15.67

* Abridged from Canada, Bureau of Statistics, 1930, *Origines, pays de naissance, nationalités et langues de la population canadienne*, pp. 221, 223.

the very different cultural situations of the citizens of France and the French in Canada must be taken into account. The Canadian French represent a group which came to America before decline in the birth rate had gained great headway in the French provinces, and which has preserved its traditional religious loyalties and ways of living intact to a far higher degree than most immigrant groups.

The Irish in Canada, however, do not have large families. Canadian Irish may represent a somewhat selected group, relative to the Irish in the United States. Moreover, the Irish in Canada have intermarried extensively with English families. Thus, less than half of all Irish women in Canada who were confined in 1921 were reported as married to Irish men, whereas nearly three-fourths of the English women had English husbands, and 80 per cent of the French women had French husbands. It is, therefore, not surprising to find that the standardized fertility rate for women aged 15–44 years in the Prairie Provinces in 1926 is 81 births per 1,000 women for the Irish, in comparison with 82 births per 1,000 women for the English, and 124 births per 1,000 women for the French.

The most intensive study of fertility in relation to cultural assimilation for different ethnic groups has been made by Wessel, using data specially collected from school children in Woonsocket, Rhode Island. Wessel collected information on the birthplaces of the parents and grandparents of school children, place of marriage of the parents, language spoken in the home, and religious affiliation. There are many nationalities in the population of Woonsocket, but sufficient samples to give reliable differences, especially as regards the habits of families of the second generation in the United States, are supplied only for British (comprising English, Scotch and English Canadian), French Canadian, and Irish stocks. The results obtained for these three groups are rather similar, both as regards intermarriage and as regards fertility, to the results obtained from the Canadian data. We again find a strong tendency for the Irish to marry outside of their own ethnic group, indicating the strong tendency of this group to become assimilated with other groups in the "melting pot" process. In the Woonsocket data, however, a somewhat higher fertility is indicated for Irish mothers than for British mothers.

TABLE 18

PER CENT OF PERSONS OF BRITISH, IRISH, AND ENGLISH EXTRACTION, OF FIRST, SECOND, AND LATER GENERATIONS IN THE UNITED STATES WHO MARRY OUTSIDE THEIR OWN ETHNIC GROUP. PARENTS OF WOONSOCKET SCHOOL CHILDREN MARRIED IN THE UNITED STATES *

	Number of Individuals in Each Group			Per Cent Marrying outside Own Ethnic Group		
	First Generation	*Second Generation*	*Other* [a] *Generation*	*First Generation*	*Second Generation*	*Other* [a] *Generation*
British	188	64	329	32.4	31.7	27.7
French Canadian	850	555	353	7.8	8.8	23.9
Irish	101	143	219	21.8	41.9	44.2

* Abridged from Wessel, 1931, *An Ethnic Survey of Woonsocket, Rhode Island*, pp. 108, 110.

[a] "Other" includes cases of persons of second generation on one side and third generation on other side, as well as persons of third or later generations on both sides.

TABLE 19

AVERAGE NUMBER OF CHILDREN PER FAMILY REPRESENTED IN THE PUBLIC SCHOOL POPULATION OF WOONSOCKET, SELECTED ETHNIC GROUPS, FOREIGN-BORN MOTHERS AND NATIVE-BORN MOTHERS *

Ethnic Derivation	Average Number of Children per Foreign-Born Mother	Average Number of Children per Native-Born Mother
British	3.0	3.1
French Canadian	4.7	4.0
Irish	4.1	3.6
All marriages between persons of same "ethnic" origin	3.9	3.7
All marriages between persons of different "ethnic" origin	3.2	3.0

* Data from Wessel, *op. cit.*, pp. 196, 197.

These data show high frequencies of intermarriage for the Irish, who represent a minority group enjoying cordial social relations with other groups. There is evidently a somewhat greater tendency for the French Canadian stocks to constitute a closed social group, but this tendency seems to break down in the third generation. The fertility trends, as indicated by data presented in the above table, appear to be closely related to these intermarriage trends. Fewest children are found among the groups which are culturally most adapted to prevailing American fashions, and among families representing intermarriage as contrasted with families all composed of members of the same ethnic group. In fact, the most conspicuous finding of Wessel's study is the very small average number of children born to native mothers and fathers of different ethnic origin (intermarriages). In the total 491 "intermarriages" in this sample, about 20 per cent of the persons marrying were French Canadians, 18 per cent Irish, 18 per cent British, and the rest, over 40 per cent, represent 22 different European stocks. Yet this heterogeneous group, except in the case of marriages among foreign-born persons, is characterized by no larger families than the group with pure English descent.

It has been shown by Maller, using 1930 census data, that there is a much higher birth rate in the predominantly Italian districts than in the predominantly Jewish districts of New York City—although there was a higher percentage of foreign-born persons in the Jewish areas than in the Italian areas. The difference in fertility between Jews and Italians in New York City, thus indicated, is attributed by the author to differences in social habits, and is associated with the more advanced cultural-intellectual status of the Jewish groups. It may also, of course, be affected somewhat by the difference in religion.[5]

Sufficient material has been introduced to show that the fertility rates of various immigrant groups from Europe are profoundly affected by their conditions of living in the United States. The operation of the melting pot process in blending ethnic strains is associated with a rapid decrease in the fertility of the stocks which are thus blended. The maintenance over several generations of conspicuously high fertility rates in any particular group must be attributed, (1) to physical isolation, as in the case of the French in Canada or the Mexicans in the Southwest, (2) to cultural factors favoring fertility, as in the case of French Canadians in New England towns, or (3) to inferior socio-economic or cultural-intellectual status. In general, it appears that present conditions of living far outweigh ethnic origin or remote national background in affecting size of family in the United States.

4. *Conclusions*

Net reproduction rates are apparently very similar at the present time for the two major racial groups in this country, whites and Negroes.

It is impossible to determine exactly, at the present time, the relative reproduction trends of whites and Negroes in the United States. The difference in rate of reproduction is not great; and all the basic data necessary for estimating reproduction trends for Negroes are seriously inaccurate. It is likely that the white group as a whole is still reproducing somewhat more rapidly than the Negro group. If so, this relationship may be reversed in the near future, or it may not. There has been a tendency in recent years for the very low reproduction rate of Negroes in large cities to rise, both through increased fertility and through lowered mortality, while the reproduction rate of whites in the same cities has been falling—but the equalization thus suggested may not actually take place.

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[5] *See* further treatment of data by Maller in Chapters VII and IX.

There is also some evidence that the effective fertility of rural Negroes has not been falling so rapidly as that of their white neighbors in the rural South during recent years. On the other hand, any continued movement of Negroes from Southern rural communities into Northern urban localities would tend to reduce their average reproduction tendency. These conflicting forces and the uncertainty of the data on this subject make any prediction of future trends for Negroes quite impossible.

Unusually high fertility, sufficient to afford high reproduction even at high mortality rates, now appears for several minor racial groups in this country, when fertility is computed for females: Mexicans, Japanese, Chinese, and American Indians. The inclusion of the last two groups in this list is a surprise, since the Chinese are predominantly urban dwellers, and there has long been a tradition that the Indian is dying out. In the case of the Indians it may be that a gradual adaptation to present conditions, and a gradual relative accumulation of the more fertile elements in the population has caused a reversal from trend toward extinction to trend toward natural increase—but statistics for the Indian population are so faulty that any broad generalization is hazardous. Conversely, as some of these minority groups become better established in American life, their present tendency toward rapid natural increase may disappear.

There is little interest in the reproduction rates of foreign groups during the first generation of American residence, from a long range standpoint, because "foreign" groups become "native" groups in the second generation. The available data on reproduction tendencies among native whites of various national origins are not very satisfactory. In general, there is clearly a tendency for families of foreign origin to adopt the family patterns of the more established families in their communities as in other respects they adopt American ways of living. The tendency toward decline in fertility in various ethnic groups seems to be correlated with the tendency to intermarry with other groups. The "melting pot process" tends to dissipate the original reproductive tendency of most immigrant groups. On the other hand, some groups may for a long time show unusual reproduction trends, in so far as they remain isolated geographically in rural communities or in special city wards or culturally by differences in religion or other traditional patterns—as in the case of French Canadians in rural communities in northern New England, or Mexicans in the Southwest. Apparently racial differences in fertility among various European groups in this country tend to persist only in so far as they become translated into persistent regional, cultural, economic, or cultural-intellectual differences. The problem of differential fertility among racial groups then becomes merged in the larger problem of differential fertility among regional and social groups.

CHAPTER IV

REPRODUCTION TRENDS OF GROUPS CLASSIFIED BY OCCUPATION OR ECONOMIC STATUS

Our study of differential reproduction among groups classified by type of community indicated surprisingly divergent tendencies. It was again rather surprising, by contrast, to find that among the major racial strains in this country there are no large differences in reproductive tendencies at present, when groups which have been exposed for some time to similar social environments are compared. We turn, therefore, with considerable interest to the analysis of variations in reproduction rates among social groups.[1]

1. *Social Classification in the United States*

Variations in occupation, income, education and interests are perhaps nowhere more pronounced than in the United States, although social groupings in this country have always been remarkably fluid. Of all types of social classification, analysis by occupation seems to afford the most significant basis of social division. It is true that occupational headings may give a poor indication of economic status; analysis both by occupational status and by income is desirable. But of these two main types of social classification, the occupational analysis seems the more useful because it involves distinctions in educational status and mode of living which may be important for demographic purposes. For example, there may be little difference in income but great contrast in mode of living between physicians and building contractors, or between carpenters and clerks, or between miners and textile workers. Nevertheless, interesting results may be obtained from studies of fertility in different "economic areas," classified according to rental values, income tax returns, frequency of telephones, and so forth. Miscellaneous studies afford data on size of family in relation to distribution of income, social status scores, school grades, intelligence test performance, and so forth. Studies have also been made of the fertility of selected groups such as college graduates, applicants for institutional care or other relief, and members of various societies. Observations on fertility in relation to education and various indices of intellectual development will be reviewed in later chapters. Detailed studies are important in throwing light on particular causes of differential fertility, and some of the results obtained from such studies will be described in Chapter XII. However, in studying broad population trends among social groups, we will rely chiefly on mass statistics.

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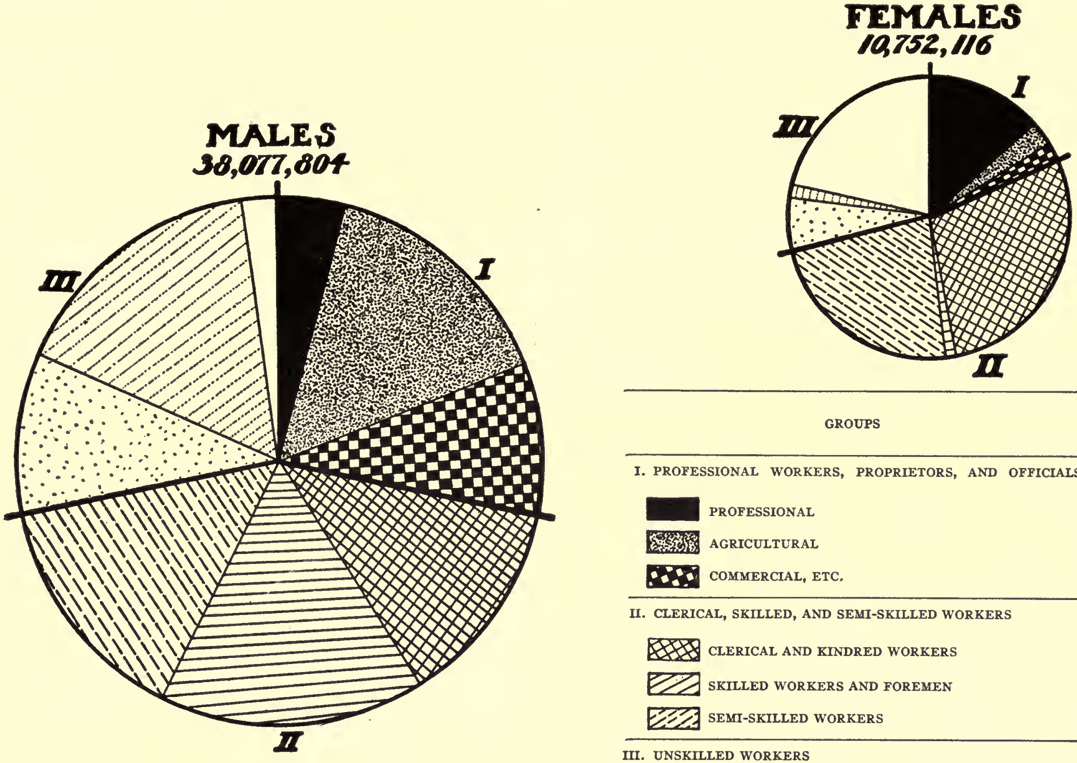
[1] Several interesting and important lines of social classification are neglected in this treatment. We shall not attempt to make any systematic treatment of variations in reproduction rates among religious groups. We may note, in passing, that there are some very large differentials among denominational groups. For example, Jews, who are urban dwellers with extremely low birth rates, are decreasing quite rapidly in numerical importance, whereas Mormons, who are predominantly rural people with an unusually high average birth rate, in spite of a recent decline, are constantly increasing in numerical importance. The contrast in this respect between Roman Catholics and Protestants is less decisive because of the high birth rates of Protestants in the rural South.

Various schemes of social grouping by occupational classes are available (*see* Taussig, 1930, and Pearl, 1933). The Census gives no official analysis by social classes, but divides workers according to industries, or types of occupation. It is highly desirable to have a classification scheme, adapted to census data, that takes account both of the most important economic gradations and also of the most important differences in type of occupation. Such a scheme is represented in the classification developed by Alva M. Edwards, 1917, and used with modifications by Sydenstricker and Notestein in the Milbank analysis of 1900 and 1910 census data. In the Milbank study occupations are grouped into the following classes: *Urban:* (1) Professional, (2) Business (with subdivisions: Proprietary, Clerical), (3) Skilled workers (with subdivisions: Skilled, Semiskilled), (4) Unskilled laborers. *Rural:* (1) Farm owners, (2) Farm renters, (3) Farm managers. Edwards, 1933, has prepared a revised classification for use with the 1930 census data. Edwards gives a distribution into six broad groups of all gainfully employed workers in the total population of the United States and in each of the principal race-nativity groups, separately for males and for females. This distribution is shown in Figures 17 and 18. Edwards' classes are here rearranged in three main groups for purposes of graphic representation.

The first diagram suggests, in striking fashion, the ambiguity of agricultural workers in any economic-social classification. Nearly two-fifths of these workers were reported as agricultural laborers, and are classified here as unskilled workers. Undoubtedly the majority of the agricultural laborers have a social-economic status that is distinctly inferior to that of farm proprietors in the same localities. But this group also includes the sons of farm operators, some of whom may be among the most highly trained and capable men in the whole farm population. Again, farm owners and farm renters are classified with the proprietary and managerial group. But as farm proprietors change places with urban workers they are distributed through all social classes. The differentiation between commercial farmers and subsistence farmers is probably much more important socially than that between farm proprietors and farm laborers; and this differentiation is being intensified by present trends.

The second diagram (Figure 18) shows the relationship at present between ethnic and social-economic groupings. If separate distribution series by occupational classes were available for particular nationality groups in the foreign white stock, it is certain that the differences indicated would be quite as striking as the differences here indicated between native whites and foreign-born whites. In this relationship the social-economic system must be recognized as the more dynamic. Ancestry is easily obscured in America,



GROUPS	PER CENT OF TOTAL	
	MALES	FEMALES
I. PROFESSIONAL WORKERS, PROPRIETORS, AND OFFICIALS		
■ PROFESSIONAL	3.9	13.5
▒ AGRICULTURAL	15.1	2.4
▩ COMMERCIAL, ETC.	9.0	2.2
II. CLERICAL, SKILLED, AND SEMI-SKILLED WORKERS		
▦ CLERICAL AND KINDRED WORKERS	12.8	28.6
▨ SKILLED WORKERS AND FOREMEN	16.3	0.8
▧ SEMI-SKILLED WORKERS	14.3	23.5
III. UNSKILLED WORKERS		
░ AGRICULTURAL LABORERS	9.8	6.0
▧ OTHER LABORERS	16.0	1.5
□ SERVANTS, ETC.	2.7	21.5

FIG. 17. GAINFUL WORKERS OF THE UNITED STATES, MALES AND FEMALES, 1930, CLASSIFIED BY SOCIAL-ECONOMIC GROUPS. Data from Edwards, 1933, "A Social-Economic Grouping of the Gainful Workers of the United States," *Journal of the American Statistical Association*, Vol. 28, p. 385.

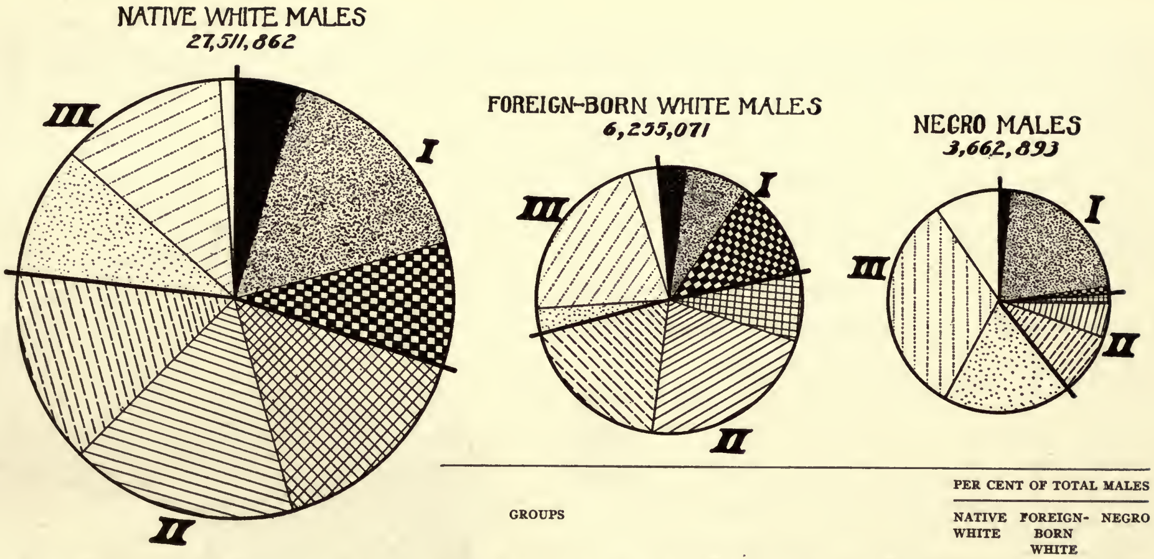


FIG. 18. GAINFUL WORKERS OF THE UNITED STATES, NATIVE WHITE MALES, FOREIGN-BORN WHITE MALES, AND NEGRO MALES, 1930, CLASSIFIED BY SOCIAL-ECONOMIC GROUPS. Data from Edwards, 1933, "A Social-Economic Grouping of the Gainful Workers of the United States," *Journal of the American Statistical Association*, Vol. 28, p. 385.

GROUPS	PER CENT OF TOTAL MALES		
	NATIVE WHITE	FOREIGN-BORN WHITE	NEGRO
I. PROFESSIONAL WORKERS, PROPRIETORS, AND OFFICIALS			
■ PROFESSIONAL	4.5	3.1	1.5
▒ AGRICULTURAL	16.1	7.1	21.8
▩ COMMERCIAL, ETC.	9.3	12.1	1.3
II. CLERICAL, SKILLED, AND SEMI-SKILLED WORKERS			
▦ CLERICAL AND KINDRED WORKERS	15.5	8.5	1.7
▨ SKILLED WORKERS AND FOREMEN	16.8	21.9	4.8
▨ SEMI-SKILLED WORKERS	14.1	18.9	9.0
III. UNSKILLED WORKERS			
░ AGRICULTURAL LABORERS	9.7	3.1	18.9
▨ OTHER LABORERS	12.6	21.2	31.7
□ SERVANTS, ETC.	1.3	4.3	9.4

but differences in economic function are conspicuous. Occupational differentiation, under any economic system, has profound social significance. Any persistent differences in personal characteristics between races or nationality groups are likely to find expression along social-economic lines.

2. *Variations in Fertility among Urban Groups Classified by Economic Status*

Data on fertility by urban districts, in relation to economic status, have not been developed so extensively for American as for many European cities. There are few studies in this country which afford satisfactory analysis of the fertility of urban districts in relation to their social characteristics. There are practically no studies of this sort which offer a dynamic analysis of secular changes in the birth rates of different urban areas in relation to changing social conditions. Greater attention to such studies would seem to be very worthwhile in spite of the statistical hazards which they involve.

The newly recorded information on home rental and ownership values, taken by the United States Bureau of the Census in 1930, now makes possible extensive studies of size of family in relation to economic status, as indicated by rental and ownership values.

Ogburn presents the results of such an analysis on the basis of a special sample of census data on about 60,000 families from East North Central states, in the chapter on "The Family" in *Recent Social Trends in the United States*. The sample is limited to families of white women of native parentage, with wives under 45 years of age. A common classification for rented and owned homes is obtained by multiplying the monthly rental by 100 to get approximate ownership value, or vice versa. The term "size of family" refers to number of persons in the "legal family," that is, "persons related in any way to the head of the family by blood, marriage, or adoption." It may include "his sisters and his cousins and his aunts" and their children. A refinement is introduced at some points by comparing families in which the wives are all about the same age, namely, 40–44 years. Variations in size of family may still be somewhat influenced by differences in the frequency of composite families and by differences in the age at which young people leave the parental roof to establish independent homes. The results of this analysis are summarized, as follows:

> "In the towns [communities of about 5,000 inhabitants] there is clearly a decline in the size of families where the wives are of the same age, as the rent increases. Thus in the towns, with a rental value of less than $10 a month, the average size of family when the wives were in the 40–44 age group was 5.22 persons and for rental values of $10–$15, $15–$20, $20–$30, $30–$50, $50–$75, and $75–$100, the sizes of the families were 4.56, 4.66, 4.15, 3.82, 3.81 and 3.42 respectively.[2]

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[2] "The numbers of families in each rental class were 122, 210, 274, 462, 548, 241 and 73, respectively. The number of cases paying the larger rents was too small to be included" (p. 687).

> "In the cities of around 100,000 inhabitants of the sample study, the sizes of the family for the different rental classes beginning with the \$15–\$20 class were 4.60, 4.33, 3.96, 3.68 and 3.50. For the rentals of from \$100–\$150, and over \$150, there was a slight increase in size of family, the number of persons being 3.70 and 4.05, but the numbers of families in the sample for these two larger rental groups were only 79 and 40, respectively. In the metropolis [Chicago], the size of the family declines as the rents increase, up to \$100, and then, as was the case in the cities, the size of the family increases as the rents go up. The number of families paying higher rents is greater in the metropolis than in the cities. The sizes of the family, beginning with the \$30–\$50 rents, are 3.60, 3.04, 3.00, 3.45, and 3.74 respectively" (pp. 686–687).

These data indicate that families living in the poorest houses in each type of community have the most children, and that size of family decreases until one reaches a fairly high level, beyond which some reversal is indicated in the larger cities, from the very small families associated with rental values of \$75–\$100 per month to moderately large families at the highest rental values. Ogburn notes that, "In the cities, where there are many renters, the families may adjust size of family and size of apartment more readily." Nevertheless, this increase in size of family in cities as one passes from the moderately high rental classes, where the smallest families are found, to the families living in the most expensive homes, is very interesting. This finding fits with other data which will be noted below, especially in considering causes affecting variations in fertility (*see* Chapter XII).

Data on variations in fertility by "economic areas" are available for Cleveland, through an analysis of census tract data, sponsored by the Cleveland Plain Dealer and carried out by Howard Whipple Green. The tracts are grouped by median rental or equivalent ownership values into 14 economic areas. Variations among these economic areas in birth rates for 1928 per 1,000 total population in 1930 and in infant mortality rates are shown in Figure 19.[3]

Births of 1928 are exhibited in the original publication in relation to numbers of women aged 15–44 and numbers of married women of all ages in 1930—with explicit caution regarding the use of the rates thus obtained. In view of the fact that Cleveland was expanding at this time, with abandonment of many houses in the poorest areas and rapid development of suburban areas, it seemed advisable to recompute birth rates for these economic areas, by interpolating for the population of each area as of July 1, 1928, on the assumption of uniform annual rates of population change in each area from 1920 to 1930. A further adjustment is also suggested at one point, in line with our present purposes. The apparent birth rate in the highest economic areas is undoubtedly influenced by the presence of unmarried domestic servants. Five of the eight tracts in the highest economic group are in Shaker Heights, which comprises only six tracts—and the median rental value for the sixth tract in this section is high ($80 per month). In 1930, 20 per cent of the 7,305 women aged 15–44 years in this section were domestic servants. If we suppose that the number of births to domestic servants that are allocated to the residence at which the mother is employed is negligible, the adjusted birth rate for women aged 15–44 years who are members of families with very high economic status would then be about 20 per cent higher than that for all women at these ages living in the highest economic area. The values obtained after these adjustments have been made are shown in Table 20.

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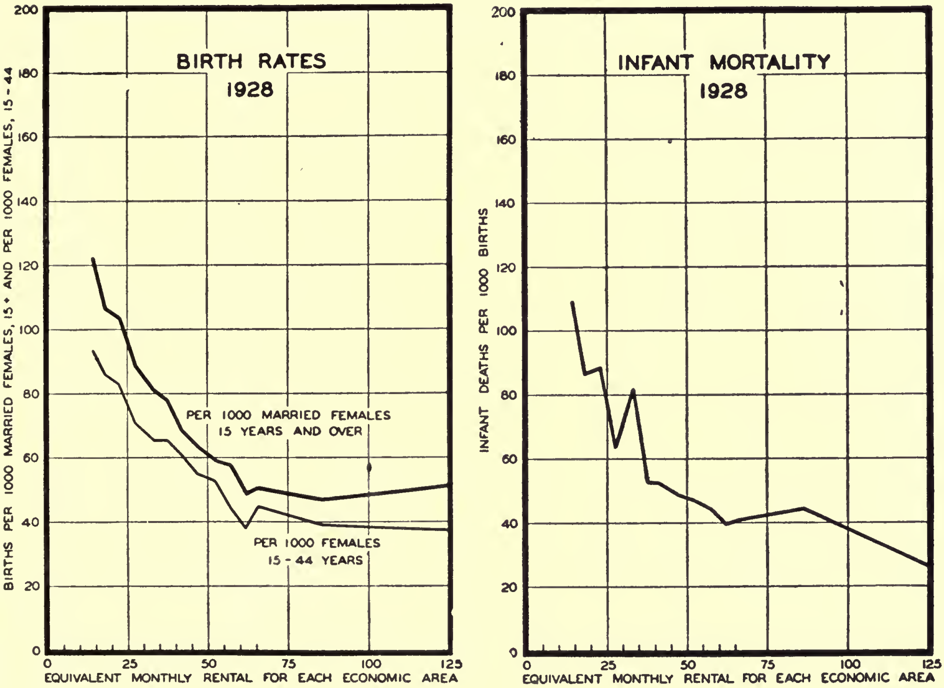
[3] The births and deaths reported by Green have been allocated by usual residence of mother or of decedent, and therefore are not influenced by hospital locations, etc.



A B

Fig. 19–A. Births, 1928, per Specified Population Units, 1930, for Cleveland Economic Areas. From Green, *Population Characteristics by Census Tracts, Cleveland, Ohio, 1930,* p. 69.

Fig. 19–B. Infant Mortality Rates, 1928, for Cleveland Economic Areas. From Green, *Population Characteristics by Census Tracts, Cleveland, Ohio, 1930,* p. 69.

The figures in the last column of Table 20 show the estimated "effective fertility" (force of fertility as modified by infant mortality) in different economic areas. The values thus obtained indicate that for every 1,000 women aged 15–44 years there were born, in 1928, about 75 surviving infants in the lowest economic areas, about 60 surviving infants in the middle economic areas, and from 45 to 54 surviving infants in the highest economic areas. Here again, as in the material just cited from Ogburn, we find some indication of a rise in effective fertility among families paying very high

TABLE 20

BIRTHS, INFANT DEATHS, AND ADJUSTED BIRTH RATES PER 1,000 WOMEN AGED 15–44, BY ECONOMIC AREAS, CLEVELAND, OHIO, 1928 *

Area	Number of Births, 1928	Number of Infant Deaths, 1928	Births per 1,000 Females Aged 15–44, Adjusted Rate [a]	Deaths under 1 per 1,000 Infants Born	Infants Surviving (to Age 1) per 1,000 Females Aged 15–44, Adjusted Rate
Total	17,744	1,072	63.38	60.4	59.55
Lowest	91	10	82.59	109.9	75.51
2	623	47	80.07	75.4	74.03
3	2,225	198	79.67	89.0	72.58
4	2,573	166	69.36	64.5	64.89
5	1,438	121	66.37	84.1	60.77
6	3,613	190	70.38	52.6	66.68
7	2,970	155	63.51	52.2	60.19
8	1,148	56	59.54	48.8	56.63
9	536	25	57.28	46.6	54.61
10	768	34	48.01	44.3	45.88
11	508	20	41.80	39.4	40.15
12	490	20	51.93	40.8	49.81
13	495	23	47.06	46.5	44.87
Highest	266	7	46.09	26.3	44.88
Highest—With 20 per cent adjustments on hypothesis of no births to servants recorded to this area	266	7	55.31	26.3	53.86

* Based on unpublished data supplied by Howard Whipple Green.

[a] Estimated number of women aged 15–44 years in each area, July 1, 1928, obtained by interpolation on assumption of constant rate of population change from 1920 to 1930 and proportion of females aged 15–44 years in total population of each area as in 1930.

rents, although the fertility of the families in the highest economic area remains below the average for the whole city. Rates for the lowest and for the highest economic areas, reduced to a relative basis, are shown in the first column of Table 21.

An analysis of variations in fertility among urban families, classified by economic status, is reported for the years 1929–1932, by Sydenstricker and Perrott. This report is based on data collected in a house-to-house survey of health conditions, as affected by the economic depression, among white families in low-cost and moderate-cost dwellings. Average annual birth rates, standardized for age, per 1,000 married women aged 15–44 years, are reported for families interviewed in four cities (Baltimore, Cleveland, New York, and Syracuse), classified by total family income in 1932. The standardized marital fertility rate (124) obtained in this way for families in this restricted sample with incomes from $2,000 to $2,500 is somewhat higher

TABLE 21

TWO INDICES OF EFFECTIVE FERTILITY FOR ECONOMIC AREAS IN CLEVELAND, FOR 1928, AND FOR 1925–1929 *

	Infants Surviving to Age One per 1,000 Women Aged 15–44 Years, 1928, Adjusted Rates	Children under 5 Years per 1,000 Women Aged 15–44 Years, 1930
	Index base [a]	Index base [b]
Cleveland, total	= 100 Relative values	= 100 Relative values
Lowest area	127	137
2nd area	124	137
12th area	84	81
13th area	75	70
14th area	75	72
14th area—With 20 per cent adjustment on hypothesis of no births and no children to servants recorded as residing in this area	90	86

* Based on unpublished data supplied by Howard Whipple Green.

[a] Absolute value, 59.55.

[b] Absolute value, 286.

than the corresponding rate (115) for families with incomes of $2,500 or over; much higher fertility is indicated by the corresponding rate (145) for families with incomes from $1,200 to $2,000; and an even higher rate (176) is obtained for families with incomes below $1,200. Furthermore, it appears that among families of given economic status in 1929 those who had dropped to a much lower economic level by 1932 were characterized by a distinctly higher average birth rate than those who maintained their established economic status during the depression. In order to simplify the presentation of this material, the status of families with incomes above $2,000 is described as "comfortable," that of families with incomes from $1,200 to $2,000 as "moderate," and that of families with still lower total income as "poor." This comparison is shown in Table 22.

It is particularly surprising to find that families in the "comfortable" group (with incomes above $2,000) in 1929 who received less than $1,200 in 1932 show a somewhat higher average fertility rate during the period in question than do the families which have maintained a "moderate" economic level (with incomes from $1,200 to $2,000) during the depression—the rate being 133 for the former group in contrast to 113 for the latter group. Does this indicate a causal influence of unemployment in raising fertility? Or, does it indicate the higher fertility characteristic of a type of workers likely to receive good wages in a period of prosperity but likely to fall into poverty in a period of depression, in contrast to groups with lower but steadier incomes? The authors cited apparently incline to the latter alternative: "It appears that high fertility was associated with inability

TABLE 22

STANDARDIZED FERTILITY RATES, 1929–1933, FOR WHITE URBAN FAMILIES CLASSIFIED BY ECONOMIC STATUS IN 1929 AND IN 1932 *

Economic Status		Number of Years Lived 1929–1932 Recorded for Married Women Aged 15–44 Years	Standardized Birth Rate per 1,000 Married Women Aged 15–44 Years
1929	*1932*		
Poor	Poor	2,404	178
Moderate	Poor	2,994	157
Moderate	Moderate	1,152	113
Comfortable	Poor	1,287	133
Comfortable	Moderate	831	104
Comfortable	Comfortable	537	107

* Adapted from Sydenstricker and Perrott, 1934, "Sickness, Unemployment, and Fertility," *Milbank Memorial Fund Quarterly*, Vol. 12, p. 132.

to succeed in the severe competition for jobs brought about by the depression" (p. 133). Whatever may be the true causal interpretation of this situation, the same sort of relationship is indicated by an analysis of fertility in relation to occupational status and employment (*see* Table 23).

TABLE 23

STANDARDIZED FERTILITY RATES, 1929–1932, FOR WHITE URBAN FAMILIES CLASSIFIED BY OCCUPATIONAL STATUS AND EMPLOYMENT *

Occupational and Employment Status	Number of Years Lived 1929–1932 Recorded for Married Women Aged 15–44 Years	Standardized Birth Rate per 1,000 Married Women Aged 15–44 Years
Total	22,540	152
Unskilled labor	3,792	182
No employed workers	702	234
Part-time workers	1,775	166
Full-time workers	1,315	169
Skilled labor	14,436	150
No employed workers	1,655	188
Part-time workers	7,374	152
Full-time workers	5,407	134
Salaried workers	4,312	134
No employed workers	337	167
Part-time workers	1,142	153
Full-time workers	2,833	120

* Adapted from Sydenstricker and Perrott, 1934, "Sickness, Unemployment, and Fertility," *Milbank Memorial Fund Quarterly*, Vol. 12, p. 130.

For groups canvassed in Birmingham, Baltimore, Cleveland, Detroit, Greenville, New York City, Pittsburgh, and Syracuse.

After citing data showing that high illness rates were also associated with unemployment and poverty during the period described, Sydenstricker and Perrott conclude this very impressive report, as follows:

"Low social status, unemployment, and low income in 1932 went hand in hand with a high illness rate and increased malnutrition among children. It was in these same groups of families that a high birth rate prevailed. Whatever the broad implications of the findings may be, it is evident that a high birth rate during the depression prevailed in families which could least afford, from any point of view, to assume this added responsibility" (p. 133).

3. *Correlation of Fertility Ratios of Cities with Various Social Factors*

The United States Bureau of the Census has supplied ratios of children under five per thousand women aged 20–44 years, in a special monograph by Thompson, for various population groups in the United States.[4] The present writers have estimated the relationship between the effective fertility of native white women in 284 American cities having 25,000 or more inhabitants and various social indices. These relations, as represented by Pearson product-moment correlation coefficients, run as follows:

Ratio of children to native white women correlated with per cent of males aged 25–64 years who filed *income tax returns*, in 1921	$r=+.27\pm.03$
Ratio of children to native white women correlated with per cent of all native women aged 20–44 years who were of *foreign or mixed parentage*, 1920	$r=-.18\pm.03$
Ratio of children to native white women correlated with per cent of all *homes owned* by occupants, 1920	$r=+.24\pm.03$
Ratio of children to native white women correlated with mean number of *families per dwelling*, 1920	$r=-.23\pm.03$
Ratio of children to native white women correlated with per cent of gainfully employed males engaged in *manufacturing and mining*, 1920	$r=+.32\pm.03$
Ratio of children to native white women correlated with per cent of all *women* 10 years of age and over *gainfully employed*, 1920	$r=-.38\pm.03$

Among cities of 25,000 population or more in 1920 the highest ratios of children under 5 per 1,000 native white women aged 20–44 years (ratios in the vicinity of 500 and up) were found in 16 heavy-industrial centers, 2 Southern textile or tobacco centers, and 2 commercial cities in Utah. The list runs as follows:

Cities with high effective fertility

Hamtramck, Michigan
Bethlehem, Pennsylvania
Hazelton, Pennsylvania
Johnstown, Pennsylvania
Portsmouth, Ohio
York, Indiana
Kokomo, Indiana
Bay City, Michigan
Port Huron, Michigan
Clarksburg, West Virginia
Huntington, West Virginia
Hagerstown, Maryland
Portsmouth, Virginia
Roanoke, Virginia
Wilmington, North Carolina
Pensacola, Florida
Winston-Salem, North Carolina
Charlotte, North Carolina
Salt Lake City, Utah
Ogden, Utah

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[4] Comparable data are not yet available for 1930. But the present writers understand that an analysis, under Thompson's direction, similar to that based on 1920 data will be prepared with 1930 data. The comparison of these two sets of data in detail will afford an excellent index of fertility trends in various population groups in the United States.

The lowest corresponding ratios (around 300 or less) were found in 19 commercial or suburban localities and in 7 light-industrial localities (with textile or knitting mills, watch manufacturing, etc.):

Cities with low effective fertility

Boston, Massachusetts
Providence, Rhode Island
Hartford, Connecticut
Manhattan, New York
Albany, New York
Washington, District of Columbia
Brookline, Massachusetts
East Orange, New Jersey
Kansas City, Kansas
Denver, Colorado
Colorado Springs, Colorado
Seattle, Washington
San Francisco, California
Berkeley, California
Los Angeles, California
Pasadena, California
Sacramento, California
San Diego, California
San Jose, California
Lawrence, Massachusetts
Amsterdam, New York
Troy, New York
Auburn, New York
Utica, New York
Waltham, Massachusetts
Elgin, Illinois

4. *Variations in Fertility of Marriage among Social Groups, Classified by Occupation* [5]

A series of reports on differential fertility among social classes has been issued by the Milbank Memorial Fund, based on an extensive analysis of United States census data collected in 1900 and in 1910. Although this analysis was initiated after 1920, it was based on earlier census data because the questions "number of children ever born" and "number of children living" have not been repeated since 1910. The sample used in this study is described as follows:

> "The importance of these unpublished census data led the Milbank Memorial Fund to undertake the tabulation of a sample of them from the original enumeration sheets. The sample comprises data for approximately 100,000 married women who lived north of the Mason-Dixon Line in 1910. It includes only those women of native-white parentage whose husbands were of like parentage, and comprises an adequate sample of each of the broad social classes. The material presented here is further limited to the 70,000 women of this sample who were of childbearing age, who had been married only once, and whose husbands had not been married previously. This group is divided into two parts: the urban sample, taken from thirty-three northern cities having total populations of between 100,000 and 500,000 in 1910, and comprising data for about 40,000 wives; and the rural sample, taken from rural parts of seventy-four neighboring counties, and comprising data for about 30,000 wives" (Notestein, 1931a, p. 38).

Variations in the average number of children ever born, as reported by wives aged 40–44 in 1910, indicate relative fertility trends in the period just prior to 1910. The "standardized cumulative birth rates," are derived by applying the age-specific rates of each social class to the age distribution of all wives in the whole sample, and adding the products thus obtained. This procedure has the advantage of taking more recent trends into account. The simpler index, number of children ever born per 100 wives aged 40–44, is otherwise a somewhat more accurate index, because the standardized cumulative rates are not affected by differences in the rate at which completed families are built up in different social classes. The differential fertility among broad social classes revealed by this study is shown in Table 24.

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[5] Studies of differential fertility based on questionnaire returns and family data supplied by college students, reported by Baber and Ross, Cattell, Hart, Holmes, and others, agree in general with the results derived from census and registration data, which are surveyed in this chapter.

TABLE 24

Children Born per 100 Wives Aged 40–44 Years, Occupational and Standardized Cumulative Birth Rates for Broad Occupational Classes, Milbank Sample of United States Census Data, 1910 *

Occupational Class	Children Ever Born per 100 Wives Aged 40–44 Years		Standardized Cumulative Birth Rates per 100 Wives Aged 15–44 Years	
	Rates for Each Class	*Ratio of Each Class to Total Urban or to Total Rural*	*Rates for Each Class*	*Ratio of Each Class to Total Urban or to Total Rural*
Urban sample	249	100	160	100
Professional	211	85	129	81
Business and clerical	224	90	140	88
Skilled manual	277	111	179	112
Unskilled manual	334	134	223	139
Rural sample	402	100	260	100
Farm owners	376	94	247	95
Farm renters	467	116	275	106
Farm laborers	471	117	299	115

* Adapted from Sydenstricker and Notestein, 1930, " Differential Fertility According to Social Class," *J. of American Statistical Association*, Vol. 25, pp. 24, 25.

The differential as regards marital fertility that is shown here for the urban social classes is large, well-defined, and consistent. A smaller differential of the same sort is also indicated for rural social groups. The ratio, for average number of children ever born per 100 wives aged 40–44 years, of the total rural group to the total urban group (161/100) is, however, much higher than the ratio of the most fertile urban social group, the unskilled manual group, to the total urban sample (134/100). The relationship, as regards marital fertility, among all these groups is shown graphically in Figure 20, representing values based on the standardized cumulative birth rates. The extent to which the differentials found among urban social classes remain in a comparison based on numbers of *living* children reported by wives aged 40–49 years in different groups is shown in Figure 21.

In order to secure an approximate index of net reproduction in different occupational groups, we shall use numbers of children *born* and numbers of children *living* as reported for mothers of children born in one year, classified by occupation of fathers, in the *U. S. Birth, Stillbirth, and Infant Mortality Statistics.* Relative indices of reproductive tendency are first obtained for different occupational groups, on the hypothesis that the difference between the means for numbers of children ever born and for numbers of children living at certain ages of mothers represents about one-half of the total reproductive loss resulting in each group from deaths of females between birth and completion of the reproductive period. The index thus obtained for all occupations except agriculture, in statistics for 1928, is then used as a base (equal to 100) in computing approximate indices of net reproduction per generation for different occupational classes—on the

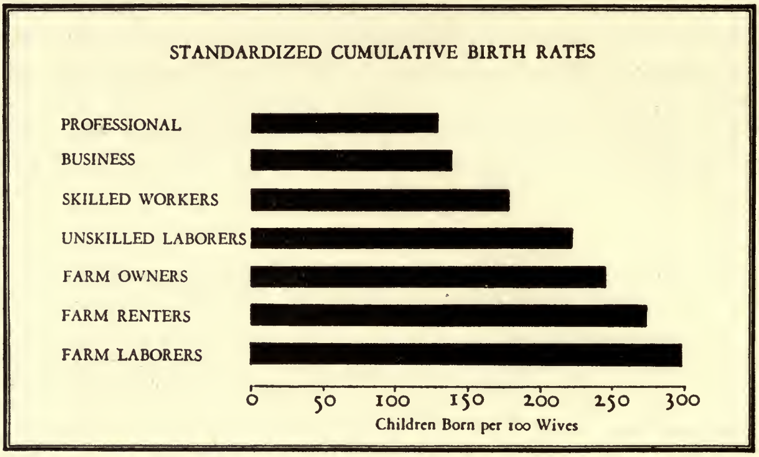

FIG. 20. CUMULATIVE BIRTH RATES (STANDARDIZED) FOR BROAD OCCUPATIONAL CLASSES, 1910. From Sydenstricker and Notestein, 1930, "Differential Fertility According to Social Class," *Journal of the American Statistical Association*, Vol. 25, p. 29. These rates are "standardized" by applying the rate for each quinquennial age group of wives under 45 years to the age distribution of the combined urban and rural samples. They represent relative rates of building up families among married couples in different social groups. The variations in *completed fertility* among these classes must be slightly greater, because the influence of variations in wife's age at marriage in different occupational classes is eliminated in this procedure.

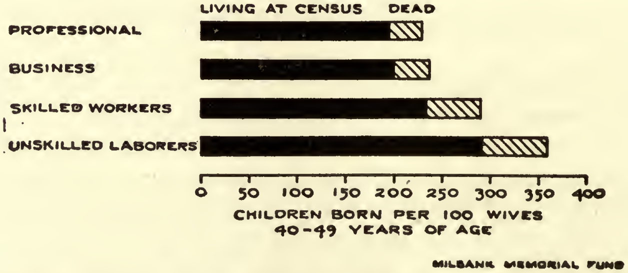

FIG. 21. CHILDREN LIVING AND CHILDREN EVER BORN PER 100 WIVES AGED 40–49, FOR FOUR URBAN OCCUPATIONAL CLASSES. Milbank sample of 1910 census data. From Notestein, 1933, "The Differential Rate of Increase among the Social Classes of the American Population," *Social Forces*, Vol. 12, p. 31.

assumption that the net reproduction rate of this base (all occupations except agriculture) was approximately that of a stationary population in the period represented by these data. The whole procedure is discussed in detail in Appendix I. The results of this analysis are subject to minor irregularities, but they may be accepted as yielding approximate indices of the net reproductive force of fertile marriages in different occupational classes (*see also* Figure 22).

TABLE 25

Index of the Reproductive Force of Fertile Couples, by Occupational Groups, Derived from Birth, Stillbirth, and Infant Mortality Statistics for the Birth Registration Area of the United States, 1928 *

Occupation of Father [a]	Total Number of Children Born to Mothers of All Ages in the Year 1928	Mean of Average Numbers of Children Reported by Mothers Aged 30–34 and by Mothers Aged 35–39		Estimated Reproduction Index
		Ever-born *a*	*Living* *b*	
All occupations [b]	2,046,178	5.058 (Diff. =	4.492 0.566)	Original value 3.926
All occupations except agriculture, forestry, and animal husbandry [b]	1,423,978	4.6460 (Diff. =	4.1014 .5346)	Original value 3.557 Taken as base = 100
Agriculture, forestry, and animal husbandry	622,200	5.9	5.3	132
Dairy farmers, farmers, and stock raisers	507,678	5.9	5.3	132
Dairy farm, farm, and stock laborers	97,244	6.3	5.45	129
Dairy farm, farm, garden, orchard, etc., foremen [a]	433	4.35	4.05	105
Fishermen and oystermen	3,202	5.8	5.0	118
Gardeners, florists, fruit growers, and nurserymen	5,791	4.55	4.1	103
Garden, greenhouse, orchard, and nursery laborers	1,066	5.05	4.45	108
Lumbermen, raftsmen, and woodchoppers	5,203	5.3	4.7	115
Extraction of minerals	73,839	6.45	5.55	131
Foremen, overseers, and inspectors [a]	927	5.6	4.95	121
Operators, officials, and managers [a]	714	4.3	3.95	101
Coal mine operatives	59,645	6.65	5.7	134
Other mine operatives	5,527	6.0	5.15	121
Quarry operatives	1,271	6.2	5.5	135
Oil, gas, and salt well operatives	5,755	4.85	4.35	108
Manufacturing and mechanical industries	769,373	4.95	4.4	108
Bakers	8,065	4.4	3.9	96
Blacksmiths, forgemen, and hammermen	8,502	5.2	4.65	115
Boiler makers	2,983	5.15	4.55	111
Brick and stone masons	10,354	4.95	4.4	108
Builders and building contractors	11,736	4.15	3.75	94
Cabinet makers	2,760	4.4	3.95	98
Carpenters	40,904	4.8	4.3	107

TABLE 25—*Continued*

Occupation of Father [a]	Total Number of Children Born to Mothers of All Ages in the Year 1928	Mean of Average Numbers of Children Reported by Mothers Aged 30–34 and by Mothers Aged 35–39		Estimated Reproduction Index
		Ever-born *a*	*Living* *b*	
Compositors, linotypers, and type setters	9,045	3.7	3.35	84
Electricians	19,991	3.95	3.65	94
Engineers (stationary), crane men, hoistmen, etc.	16,468	4.35	3.9	97
Filers, grinders, buffers, and polishers	2,924	4.6	4.05	98
Firemen (except locomotive and fire department)	6,109	4.95	4.4	108
Foremen and overseers (manufacturing)	12,264	4.35	3.9	97
Furnace men, smelter men, heaters, pourers, etc.	1,130	5.3	4.65	112
Jewelers, watchmakers, goldsmiths, and silversmiths	1,598	3.65	3.35	86
Laborers: Building, general, and not specified	262,483	5.9	5.0	115
Other specified laborers in manufacturing and mechanical pursuits	13,555	5.75	4.9	111
Machinists, millwrights, toolmakers, and mechanics, not otherwise specified	93,653	4.35	3.9	97
Managers, superintendents, manufacturers, and officials	19,150	3.2	3.0	78
Molders, founders, and casters (metal)	2,490	5.55	4.9	119
Painters, glaziers, varnishers, enamelers, etc.	25,173	4.7	4.2	104
Paperhangers	1,060	5.0	4.45	110
Pattern and model makers	1,330	3.65	3.35	86
Plasterers and cement finishers	5,545	5.1	4.45	107
Plumbers and gas and steam fitters	14,663	4.35	3.9	97
Pressmen and plate printers (printing)	1,598	4.05	3.7	94
Semi-skilled operatives	142,653	4.9	4.3	104
Shoemakers and cobblers (not in factory)	4,623	5.55	4.4	91
Stone-cutters	1,279	5.0	4.35	104
Structural-iron workers (building)	1,103	4.7	4.1	98
Tailors	7,558	4.25	3.8	94
Tinsmiths and coppersmiths	5,577	4.6	4.1	101
Upholsterers	2,358	3.95	3.6	91
Transportation	154,203	4.7	4.2	104
Water:				
Captains, masters, mates, and pilots [a]	784	4.05	3.6	89
Longshoremen and stevedores	1,848	5.7	4.8	110
Sailors and deck hands	1,043	4.2	3.65	87
Road and street:				
Chauffeurs	28,524	4.5	3.95	96
Draymen, teamsters, and expressmen	41,273	5.15	4.5	108
Garage keepers and managers	2,150	4.05	3.7	94
Laborers (garage, road, and street)	4,887	5.2	4.6	112

TABLE 25—*Continued*

Occupation of Father [a]	Total Number of Children Born to Mothers of All Ages in the Year 1928	Mean of Average Numbers of Children Reported by Mothers Aged 30–34 and by Mothers Aged 35–39		Estimated Reproduction Index
		Ever-born *a*	*Living* *b*	
Railroad:				
Brakemen	5,662	4.7	4.25	107
Conductors (street and railroad)	4,838	4.15	3.7	91
Foremen and overseers (steam and street)	3,036	5.55	4.95	122
Laborers (steam and street)	10,599	6.05	5.15	119
Locomotive engineers	2,070	4.5	4.15	107
Locomotive firemen	3,425	4.75	4.25	105
Motormen (steam and street)	3,606	4.4	3.95	98
Officials and superintendents (steam and street)	1,102	3.6	3.35	87
Switchmen, flagmen, and yardmen (steam and street)	4,088	4.7	4.2	104
Ticket and station agents	1,244	3.85	3.55	91
Express, post, telegraph, and telephone:				
Agents and messengers (express) and railway mail clerks	1,038	3.55	3.35	89
Mail carriers	6,314	4.1	3.8	98
Telegraph and telephone linemen	5,542	4.05	3.7	94
Telegraph operators	2,912	3.95	3.6	91
Trade	196,170	3.8	3.45	87
Bankers, brokers, and money lenders	7,472	3.0	2.85	76
Commercial travelers	1,932	3.25	3.1	83
Insurance agents and officials	11,255	3.5	3.1	76
Laborers in coal and lumber yards, warehouses, etc.	1,910	4.9	4.35	107
Real estate agents and officials	5,701	3.4	3.15	82
Retail and wholesale dealers, importers, and exporters	86,189	4.1	3.7	93
Undertakers	1,399	3.5	3.2	82
Public service (not elsewhere classified)	24,849	4.2	3.75	93
Firemen (fire department)	3,801	4.35	3.95	100
Guards, watchmen, and doorkeepers	2,148	5.2	4.65	115
Laborers (public service) [a]	754	5.9	5.0	115
Marshals, sheriffs, detectives	1,326	4.4	3.85	93
Officials and inspectors (city and country)	2,075	3.65	3.35	86
Officials and inspectors (State and United States)	2,905	3.4	3.15	82
Policemen	6,920	4.1	3.7	93
Soldiers, sailors, and marines	3,372	3.45	3.1	77
Professional service	65,927	3.2	2.95	76
Actors and showmen	1,960	3.4	3.1	78
Architects	1,284	2.7	2.5	65
Artists, sculptors, and teachers of art	1,109	2.65	2.5	66
Authors, editors, and reporters	2,007	3.0	2.85	76
Chemists, assayers, and metallurgists	2,600	2.95	2.8	74
Clergymen	6,275	4.4	3.95	98

TABLE 25—*Continued*

Occupation of Father[a]	Total Number of Children Born to Mothers of All Ages in the Year 1928	Mean of Average Numbers of Children Reported by Mothers Aged 30–34 and by Mothers Aged 35–39		Estimated Reproduction Index
		Ever-born *a*	*Living* *b*	
Dentists	3,408	2.7	2.5	65
Designers, draftsmen, and inventors	3,844	2.9	2.7	70
Lawyers, judges, and justices	6,475	3.0	2.8	73
Musicians, and teachers of music	3,481	3.7	3.3	76
Photographers	1,144	3.45	3.1	77
Physicians and surgeons	5,756	2.8	2.65	70
Teachers (school)	10,457	3.2	2.95	76
Technical engineers	9,207	2.85	2.65	69
Domestic and personal service	53,582	4.4	3.9	96
Barbers, hairdressers, and manicurists	13,934	4.6	4.1	101
Elevator tenders	1,600	3.95	3.4	80
Hotel keepers and managers	1,070	3.6	3.25	82
Janitors and sextons	4,953	5.1	4.4	104
Laundry operatives	2,840	4.35	3.9	97
Porters (except in stores)	3,723	5.15	4.25	94
Restaurant, café, and lunch-room keepers	4,728	3.95	3.55	89
Servants	9,462	4.15	3.65	89
Waiters	3,807	3.8	3.35	76
Clerical occupations	86,035	3.35	3.05	78
Agents, canvassers, and collectors	8,626	3.15	2.9	74
Bookkeepers, cashiers, and accountants	16,621	3.0	2.8	73
Clerks (except in stores)	59,913	3.45	3.2	83

* Data from U. S. Bureau of Census: *Birth, Stillbirth, and Infant Mortality Statistics for the Birth Registration Area of the United States, 1928;* Table 10, pp. 199–208.

[a] A few occupational classes, of special interest, for which the number of births is less than 1,000 have been included. All classes, except miscellaneous groups, for which groups the number of births was above 1,000 have been used.

[b] Exclusive of births, certificates of which state father unoccupied or occupation of father unknown.

Many interesting variations appear among specific occupations; some of these variations throw light on factors affecting natural increase. The lowest reproduction indices occur in the cases of architects (reproduction index, 65), dentists (65), artists, sculptors, and teachers of art (66), technical engineers (69), designers, draftsmen, and inventors (70), and physicians and surgeons (70). The reproduction index of the clerical group (78) is lower than that of merchants (retail and wholesale dealers, importers, and exporters, 93). Soldiers, sailors, and marines, as might be expected, are relatively infertile (reproduction index, 77). However, the index for all workers engaged in transportation (104) is only slightly lower than for all workers in manufacturing and mechanical industries (108). Unusually high child mortality appears in the case of shoemakers and cobblers, fishermen and oystermen, miners (especially coal miners), longshoremen and stevedores,

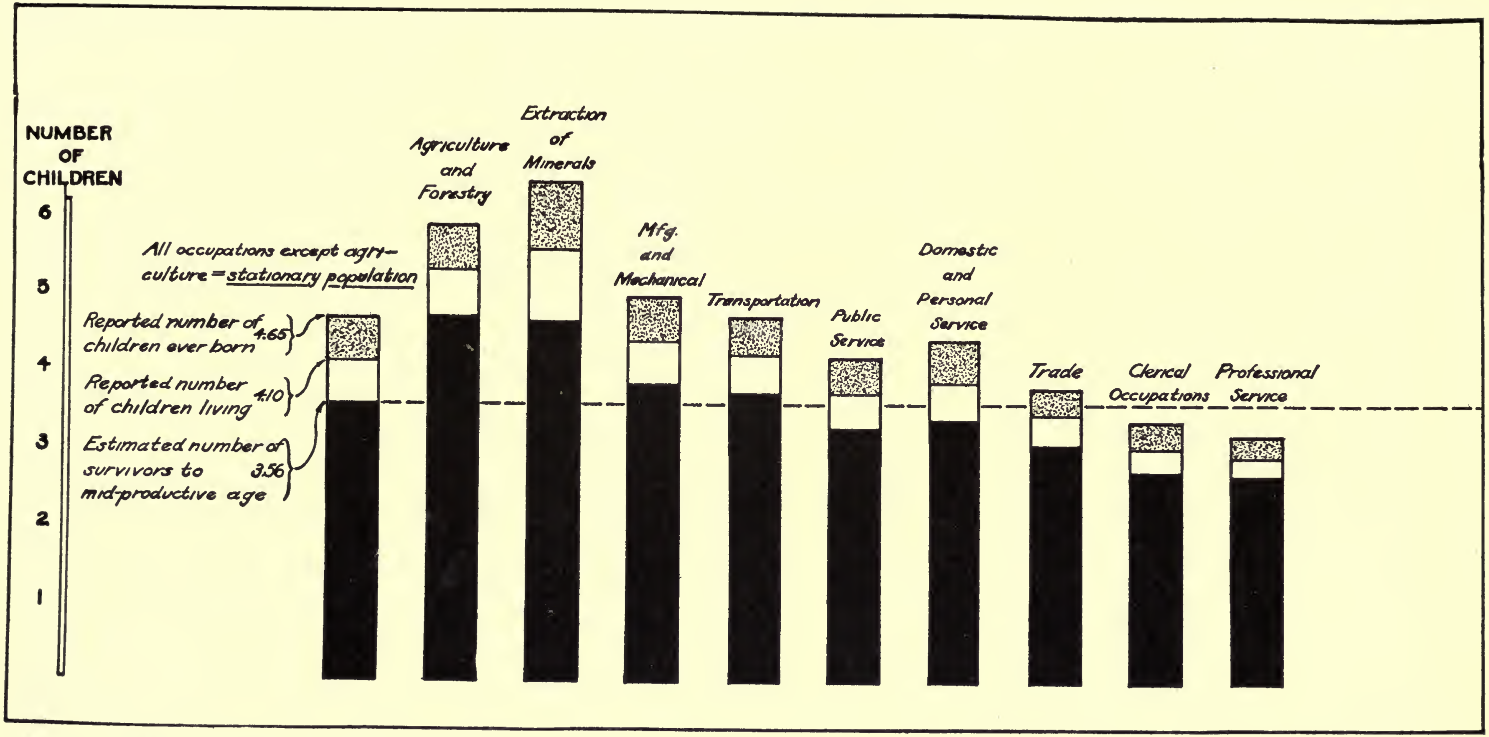

FIG. 22. AVERAGE NUMBER OF CHILDREN EVER BORNE (OUTLINED BAR) BY MOTHERS AGED 30–34 YEARS AND 35–39 YEARS IN EACH OCCUPATIONAL GROUP, WITH ESTIMATED NET REPRODUCTION INDEX (SOLID BARS). The light dotted area within each outlined bar represents the reproductive loss in that occupational group due to deaths of children from birth to the date of the report. The pure white area represents the estimated additional reproductive loss due to deaths at later ages. The horizontal line indicates an approximate replacement level, on the hypothesis that the total nonfarm population was about replacing itself in the period represented by these statistics. Where the black bars rise above this line, the groups represented were presumably having more children than needed for mere family maintenance. Where the black bars do not reach the line, the families represented were presumably not having enough children to replace the adults in these occupational groups.

and porters. Nevertheless, all of these groups except the last have net reproduction rates well above the general average. Very low values for child mortality appear in the case of several groups which also have low fertility rates; minimum frequency is found in the following groups: authors, bankers, chemists, physicians, and surgeons. All of these groups have very low net reproduction indices. The highest reproduction indices appear in the case of coal mine operatives (134) and quarry operatives (135).

These estimated net reproduction rates for specific occupations have been combined into rates for six broad occupational classes—in accordance with a system of classifications used by Haggerty and Nash.[6] The results of this grouping are shown in Table 26.

TABLE 26

Estimated Net Reproduction Rates per Generation of Broad Occupational Classes, Based on United States Birth, Stillbirth, and Infant Mortality Statistics, 1928

Occupational Classes	Estimated Net Reproduction Rate per Generation
Unskilled	1.17
Agriculture	1.32
Semi-skilled	1.03
Skilled	1.06
Business and clerical	.85
Professional	.76

The variations in this series are quite similar to those reported by Sydenstricker and Notestein from their analysis of a large sample of 1910 census schedules (*see* Table 24). Among the urban groups there is some suggestion in our more recent data of a narrowing of the differentials between the unskilled and skilled classes, and between the skilled group and the business and clerical group, but not between the latter and the professional group. But such minor differences between the two series cannot be assigned any exact significance because of the differences in samples and in methods of analysis.

The index of reproduction (132) for the farm population obtained through our analysis of birth registration data is only 32 per cent above the corresponding index for the total nonfarm population. The rural-urban differential thus indicated is distinctly less than that indicated for the Milbank sample of 1910 census data, where the average number of children ever-born to each rural wife aged 40–44 years (4.02) is 61 per cent higher than the average number in the case of the urban wives (2.49).[7] However, it must be noted that our analysis does not take account of the influence of varying frequencies of childless marriages on net reproduction rates in different groups. This factor is probably not very important in comparisons between urban groups (*see* Appendix I), but it is important in comparing rural groups with urban groups. This factor is taken into account in the Milbank analysis, and our index at this point can be corrected by reference to findings in this study. In the Milbank sample, 15.7 per cent of all urban wives and 9.2 per cent of all rural wives were childless.[8] On the basis of these frequencies, we may estimate that our index of the reproductive force of fertile rural marriages should be raised to 142 to give a proper index of the reproductive force of all marriages in the total farm population of the United States during the period reflected in these statistics. And the ratio 142/100 may then be taken as an index of the rural-urban differential in fertility of marriage. The difference between this index of the rural-urban differential in fertility of marriage and that indicated in the Milbank analysis (161/100) may be due to differences in the composition of the samples used, or to differences in method, or to a secular trend toward a diminution of rural-urban differential in fertility. On the last alternative, we would be forced to the supposition that in a period roughly defined as 1890 to 1910 (represented in the 1910 Milbank data) there was a greater differential in fertility of marriage between farm and city families of old native stock living in the Northern United States than in the total population in a period running from about 1913 to 1928. This is possible, but it is not clearly substantiated by other figures, so far as we can see.

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[6] *See* Chapter VIII, below.

[7] Sydenstricker and Notestein, 1930, p. 24. These values are obtained for a sample weighted so as to give each occupational class representation as in the general population.

In 1930, 89.6 per cent of all rural-farm women aged 35–39 were reported as wives (not widowed or divorced) in contrast to 80.5 per cent of all nonfarm women in this age class. On the basis of this finding, we may estimate that our index (142) for the rural-urban differential in fertility of marriage should be raised to 158 to indicate the true differential in net reproductive force between total rural and total urban groups. This value agrees fairly well with the corresponding index, 162, obtained by our analysis of ratios of children to women in the white rural-farm population and in the white nonfarm population of the United States, 1925–1929.[9]

5. *Variations in Marital Proportions among Social Classes*

Most of the data on differential fertility among social classes in the United States, described above, are based on statistics for families, wives, or mothers, classified by occupation of husband or occupation of the father reported on birth records. We have found that in the case of the rural-urban differential our results are considerably modified by taking into account variations in frequency of childlessness and in frequency of marriage. It is possible, therefore, that our results might also be considerably modified, if it were possible to take into account variations in marital proportions among urban social classes. The point needs careful consideration. But the scanty data available on this subject do not indicate the need for large modifications.

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[8] Notestein, 1932, p. 160. Adjusted values (*see* previous footnote).

[9] *See* Chapter II, Table 7. For a further discussion of factors affecting the rural-urban differential in fertility, *see* Appendix G.

Unfortunately, it is impossible to give any exact account of variations in marital proportions among different occupational classes. In fact, the lack of data on marriage frequencies in different groups makes one of the biggest gaps in vital statistics for the United States. Census data supply excellent indication of variations in marital proportions by age and sex for different localities and for different race and nativity groups, but not for different occupational, economic, or other social groups. An analysis of the marital condition of male workers according to occupational classification was reported by the Bureau of the Census for 1900. Separate analysis by marital status is not available for particular age classes; but the age distribution of all workers in each occupation is available. The difference between the per cent of all male workers in any occupation who are 25 years or over and the per cent of all male workers in any occupation who have ever married gives an *index of celibacy or delayed marriage.* Omitting some exceptional groups, this index varies from 7.1 for all farmers (including farm laborers) to 17.3 for physicians and surgeons and for clergymen, 17.8 for mine workers, 19.2 for bookkeepers and accountants, 21.3 for lawyers, 22.3 for teachers, and 25.6 for servants and waiters—with intermediate values similar to the index for all occupations (11.9) for manufacturers, merchants, carpenters, boot and shoe workers, barbers, and so forth.[10] Apparently, then, in 1900 there were fairly high proportions of unmarried males *or* males delaying marriage to advanced ages at both extremes of the social scale, with the highest marriage rates in the intermediate social groups represented by tradesmen, skilled manual workers, and farmers.

However, it is likely that the low values indicated for the professional workers are due in large part, at least, to the delay in marriage characteristic of this group. Cattell (1917, p. 248) found that the percentage of unmarried men among 1,000 eminent scientists was very similar for ten-year age classes at ages 40 and over to the corresponding percentages for men in the general population, as reported in the Census of 1900. Huntington and Whitney report more recent evidence to the same effect, based on an analysis of men in *Who's Who in America, 1926–1927.* These authors make an adjustment on the assumption that 10 per cent of the men who do not report themselves as married actually are married. Their adjustment, in this instance, is small; but although reasonable, may seem somewhat arbitrary. However, even if we can eliminate this adjustment, we still find that the proportion of ever-married men, 87.3 per cent,[11] is as high in this group of eminent men, mostly professional workers, as in the general population. The modal birth year for the men in this sample is apparently located in the decade 1870–1879. Almost as many were born in the previous decade, but less than half as many in the following decade. The proportion under 40 among the men in *Who's Who* must therefore be quite small (*op. cit.*,

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[10] *See* Appendix J.

[11] Recalculated from adjusted value, *op. cit.*, p. 338.

p. 159). According to census data for 1930 we find that among 100 men aged 40 to 44 years, 86.9 have been married. The corresponding percentages are 88.1 for men aged 45–49 years, 89.1 for men aged 50–54 years, and 89.7 for men aged 55–59 years. Moreover, the proportion of the widowed among the ever-married must be considerably higher in all groups with low economic status than among the professional and business groups.

The data which we have been considering, therefore, seem to indicate that the proportion of men who are married at 40 years of age is probably about the same for the professional group and for the skilled labor group; it is apparently high in the case of farm workers; but in the urban population the proportion of the married is apparently lower among unskilled male workers than in the general male population. These suggestions are tentative, due to the inadequacy of the data on which they are based. They show clearly the need of an accurate analysis of marital proportions among workers in different occupational groups, at specific ages.

It has been shown that there is little or no significant correlation between the percentage of persons aged 15 years or over who file income tax returns and the percentage of persons aged 25 years or over who are married, for a sample of 162 American cities, with data for 1920 and 1921 (*see* Groves and Ogburn, p. 291). "It is perhaps surprising that there should be so little correlation . . . and that what little correlation there is should be negative [$r = -0.17 \pm .076$]. It may be, of course, that there are other factors influencing the correlation and it also may be that the different income levels have worked out their influence on standards of living which in turn have affected habits and personalities" (*ibid.*).

There is apparently little consistent variation in marriage rates in relation to social status. It is likely, however, that in spite of the low marriage rates characteristic of women who are college graduates, marriage rates are generally lower for unskilled laborers than for any other large group of males. It may be, then, that the net reproduction rates reported above for urban unskilled groups, based on analysis of family statistics, may be somewhat too high, in relation to similar rates for other groups, especially in view of the consideration that the proportions of married persons near the end of the reproductive period (when such statistics are usually collected) is probably lower in these groups than in the general population. If the representation of the unskilled workers' group should prove to be 5 per cent less complete than the corresponding representation of the general population in a random sample of mothers, the estimated net reproduction rate per generation for unskilled workers would be reduced from 1.17 to 1.11; if the representation for the unskilled workers' group were 10 per cent less complete than that for the general population, the reproduction rate for this group would be reduced to 1.05, i.e., to about the level indicated for other urban manual workers. It is possible, however, that a somewhat lower proportion of childless married women in the unskilled group may entirely offset the somewhat higher proportion of single and widowed persons which is probably characteristic of this group. It seems unlikely that relative reproduction rates for any other broad urban social groups would be much affected if variations in marriage frequencies could be taken accurately into account. No exact conclusions, however, are possible on this subject on the basis of the evidence now available.[12]

6. *Secular Trends in Differential Fertility in Europe*

The rise of conspicuous differential fertility among social classes in European society seems to have been largely concomitant with the general decline of the birth rate. It is possible to trace the gradual heightening in England of class differentials in fertility, by reference to census data regarding numbers of children born to couples of different ages, collected in 1911, and analyzed by the Registrar General's office. Before taking account of class differences, we may observe that the frequency of legitimate births per 1,000 married women, aged 15–44 years, in the general population of England first began to show a considerable decrease in the Eighties—although a conspicuous decline in fertility was taking place in France and in the United States throughout the Nineteenth Century. The decline in fertility in England seems to have been quite gradual at first, but gained momentum rapidly during the Nineties. Incidentally this was the period in which propaganda for artificial family limitation first began to make headway in England.

The data on fertility of marriage in relation to occupation are analyzed in the Registrar General's study for five broad social classes, with separate treatment of three special occupational classes (Part 2, p. lxxvi):

Class I.	"Upper and middle class"—"It covers such occupations as commercial and railway clerks and insurance agents, but aims at excluding the artisan, even though his wage may be higher than the clerk's."
Class II.	Intermediate between I and III.
Class III.	Skilled laborers.
Class IV.	Intermediate between III and V.
Class V.	Unskilled laborers.
Class VI.	Textile workers.
Class VII.	Miners.
Class VIII.	Agricultural laborers, including farm bailiffs and foremen.

The gradual widening of differentials in fertility among these classes during the last half of the Nineteenth Century is shown in Table 27.

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[12] Unpublished census data happen to be available for 1930 for five states, giving marital conditions of males by occupation and by age. Computations might be based on these data which would largely remove our uncertainty on this important point, at a cost of approximately five hundred dollars.

TABLE 27

CHILDREN BORN, PRIOR TO 1911, TO ENGLISH COUPLES OF DIFFERENT OCCUPATIONAL CLASSES IN MARRIAGES OF THE SAME DATES. ALL AGES OF WIFE AT MARRIAGE, STANDARDIZED *

Duration of Marriage in Years	Date of Marriage	Children Born per Marriage in Each Occupational Class Prorated on Basis: Children Born per Marriage in All Occupational Classes of the Same Date = 100							
		Class I	*Class II*	*Class III*	*Class IV*	*Class V*	*Class VI*	*Class VII*	*Class VIII*
50–60	1851–1861	89	99	101	99	103	94	108	105
40–50	1861–1871	88	96	101	100	104	94	113	104
30–40	1871–1881	81	93	101	101	107	93	117	109
25–30	1881–1886	76	89	100	101	110	92	124	114
20–25	1886–1891	74	87	100	101	112	90	126	114
15–20	1891–1896	74	88	99	101	113	88	127	115
10–15	1896–1901	76	89	98	101	113	86	125	114

* Abridged from *Census of England and Wales, 1911*, Volume 13, Pt. II, p. xcii.

It is seen that even in marriages formed shortly after the mid-point of the Nineteenth Century marital fertility was somewhat lower for Class I (professional, business, and clerical workers) and for Class VI (textile workers) than for other occupational groups.[13] But in the more recent marriages these two classes show deviations from the general average of all marriages that are twice as large as the deviations observed in the earliest marriages included in this series. Decline in relative fertility in Class II (an intermediate group) was gradual throughout the period covered by this report. The fertility of the skilled artisans (Class III) first dropped below the general average in marriages contracted after 1890.

Data on fertility rates for London boroughs, using number of legitimate births per 100 married women, have been presented by Heron for the years 1851 and 1901. These rates are correlated with various indices of social status. Heron's materials are here supplemented, for comparative purposes, with figures for 1921 and 1929, thus showing comparable correlations, at intervals, over three-fourths of a century. The results, given in the accompanying table, show that at least in the city of London there was a well defined negative correlation between economic status and fertility as early as 1851. This correlation was further intensified during the next fifty years.

It appears that variations in fertility among London boroughs, classified with reference to indices of wealth, were still well marked in 1929, and similar in character to the variations found at the end of the Nineteenth

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[13] Influence of differences in age of wife at marriage has been eliminated from the figures in this table, so that the observed variations in fertility must be attributed to more extensive early practice of contraception in these classes, greater exercise of continence, less capacity to bear children, or some combination of these factors.

TABLE 28

COMPARISON OF CORRELATIONS OF MARITAL BIRTH RATES AND INDICES OF SOCIAL STATUS IN 1851 AND 1901, ACCORDING TO HERON, WITH COMPARABLE CORRELATIONS FOR 1921 AND 1929, LONDON BOROUGHS

Indices of Social Status	Correlation Coefficients between Specified Indices of Social Status and Legitimate Births per 1,000 Wives (All Ages)			
	1851[a] *35 Boroughs*	*1901*[a] *27 Boroughs*	*1921*[b] *27 Boroughs*	*1929*[c] *27 Boroughs*
Number of female domestic servants per 1,000 families	−.630±.069	−.801±.046	−.745±.057	−.758±.055
Number of professional men per 1,000 males	−.529±.082	−.783±.050	−.678±.070	−.771±.053
Number of general laborers per 1,000 males	+.120±.112	+.518±.095	+.460±.101	+.499±.097
Number of pawn brokers per 1,000 males	+.213±.109	+.627±.079	−.009±.128	−.020±.128
Number of children dying under 1 year per 1,000 births	−.296±.104	+.506±.097	+.551±.090	+.175±.125

[a] Heron, 1906. *On the Relation of Fertility in Man to Social Status during 50 Years*, p. 18.

[b] Data from *Census of England and Wales, 1921*, Vol. 3, County of London, Part 1, pp. 1, 38–45; Part 2, pp. 48–109.
Statistical Abstract for London (1921), pp. 6, 10.

[c] Data from Great Britain, *Registrar General's Statistical Review, 1929*, Part II, pp. 28–29. Estimated marital birth rates correlated with occupational data of 1921 and infant mortality data of 1929. Number of wives in 1929 estimated by application of proportion of wives per 1,000 total population of each borough in 1921 to official estimates of total population of each borough in 1929.

Century. The positive coefficients of correlation, in 1929, for marital birth rate with proportion of domestic servants, and for marital birth rate with proportion of professional workers and the negative relationship between marital birth rate and proportion of general laborers are clearly significant. It is likely that the "number of pawnbrokers" is not a reliable index of the economic status of people in different districts. The low correlation (less than twice its probable error) between fertility and infant mortality is interesting; but a detailed analysis shows that infant mortality rates vary greatly in different years for the same boroughs, so that such rates are less indicative of social status than the first three criteria listed above.[14] We conclude that in London the social class differential, which was greatly widened during the last half of the Nineteenth Century, has as yet remained fairly constant, in spite of marked decrease in birth rates of all classes.[15]

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[14] The fairly high infant mortality rates found in 1929 in Westminster (7.7), Holborn (7.4), and Lewisham (10.1) in contrast to the mean (7.1), and the low rates in Bethnal Green (6.4) and Hackney (5.7), all having deviations opposite to the deviations of the marital birth rates in these boroughs, must be attributed to other factors rather than accepted as a valid index of the social status of these districts. This inference is confirmed by noting that these unexpected deviations in infant mortality do not appear in the following year, 1930.

[15] Ungern-Sternberg, 1932, has advanced the thesis that, "There is little or no difference between the present-day birth-rate of the 'middle-class,' the 'rich,' and the 'proletarians.'" He

Edin's studies in Stockholm have furnished the first striking evidence of a reversal of the usual social class differential as regards fertility. His data were derived from birth registration cards combined with census schedules (which are much more comprehensive in Sweden than in the United States). Eliminating the effects of differences in marriage ages, he found that for recent marriages the standardized fertility rate, based on number of children born per surviving couple, was 45 per cent higher for the wealthiest class (annual incomes above 10,000 crowns) than for industrial workers; and the standardized fertility of the class receiving 6,000 to 10,000 crowns was 17 per cent higher than that of the industrial workers. The higher fertility of the wealthier classes was apparently most remarkable during the period of the World War. An analysis of birth rates by the Statistical Office of the City of Stockholm is also reported, giving total births per 1,000 women, aged 15–45, and legitimate births per 1,000 married women of the same ages in two contrasting districts of that city, characterized as "Wealthier" and "Poorer." In recent years there seems to have been no difference in general fertility rates between the wealthier and the poorer areas; and the marital fertility rate of the well-to-do is found to be well above that of the poorer.

TABLE 29

BIRTHS PER 1,000 WOMEN, AGED 15–44, SELECTED DISTRICTS, STOCKHOLM, 1911–1927 *

Year	Wealthier District	Poorer District	Rates in Poorer District Expressed as per Cent of Rate in Wealthier District
	Total births	*Total births*	*Total births*
1911	66	92	139
1916	48	58	121
1921	47	50	106
1927	36	36	100
	Legitimate births per 1,000 wives	*Legitimate births per 1,000 wives*	*Legitimate births per 1,000 wives*
1911	143	154	108
1927	84	74	88

* From Edin, 1929, "The Birth Rate Changes," *Eugenics Review*, Vol. 20, p. 259.

Without attempting to deal critically with data for various European cities we may note that the disappearance, or reversal, of social class differ-

cites crude birth-rate statistics for various cities to support this thesis (p. 114). The London data show comparison between the four "poor" districts used above and Kensington, Westminister, Hampstead, and Chelsea, selected as "rich" districts—for the period 1906–1910, and post-war years through 1929 (p. 115). The average annual rate in the poorer districts was 33.20 births per 1,000 total population in 1906–1910, and 19.84 in 1926–1929, a decrease of 40 per cent. The corresponding average rate in the wealthier districts was 18.55 in 1906–1910 and 12.47 in 1926–1929, a decrease of 33 per cent. The average rate in the wealthier districts in the latter period was still only 63 per cent of the average rate in the poorer districts. It may be that the class differential will disappear in London, but the statistics do not prove this.

D. Caradog Jones has adduced further evidence, based on social survey data, of large differentials in fertility among social classes in England (Liverpool) during recent years.

Data on differential birth rates among city districts must always be used with caution. The entials in fertility has been reported for Stockholm,[16] Berlin, Dresden, and several other German cities,[17] Rotterdam,[18] and Glasgow.[19] On the other hand, in Paris, Hamburg, and Edinburgh, as in London, the differential among social classes may have become slightly diminished but is still large.[19] For example, in Paris, where family limitation was first introduced in extensive and effective fashion, the average crude birth rate per 1,000 total population in 1929–1930 was 10.85 in three selected wealthy districts, and 16.45 in three selected poor districts. Such data whet a lively interest in the causes of constant, increasing, diminishing, and reversed social class differentials in fertility in different communities characterized by different social conditions.

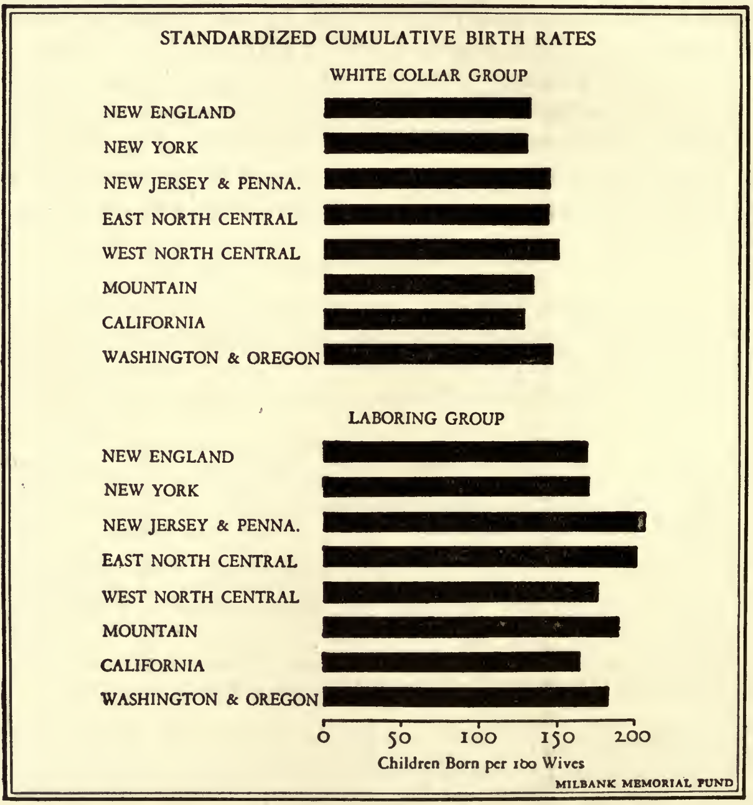

FIG. 23. CUMULATIVE BIRTH RATES (STANDARDIZED) FOR WIVES UNDER 45 IN "WHITE COLLAR" AND "LABORING" GROUPS IN DIFFERENT GEOGRAPHIC AREAS. Milbank sample of 1910 data. From Berry, 1931, "Differential Fertility According to Geographic Areas in the United States," *Quarterly Bulletin of the Milbank Memorial Fund*, Vol. 9, p. 94.

analysis of differential fertility on the basis of crude birth rates in different urban districts is rather hazardous statistically, because of variations in age distribution, incomplete registrations, and other disturbing factors. Even refined data (specific birth rates, ratio of children to women, and so forth) on fertility trends in different wards or other city divisions are subject to considerable error.

[16] Edin. [17] Freudenberg. [18] Sanders. [19] Ungern-Sternberg.

7. *Fertility of Marriage among Social Classes in Various Types of Communities*

Detailed studies conducted as a part of the Milbank analysis of differential fertility, based on 1900 and 1910 census data, show variations in differential fertility in different geographical areas and in communities of different size. It will be remembered that the samples used in the Milbank analysis are limited to married persons among native whites of native parentage in the Northern United States. The study is also limited to surviving couples of first marriages. White collar workers were found to have had smaller families than urban laborers in every area, according to 1910 census data. In fact, the families of the white collar workers in the West North Central states, with the highest fertility for this class, were smaller than the families of laborers in California, where the lowest fertility rates for the laboring group were found. The white collar workers as a group, however, appeared to be less affected by factors associated with geographic location than did the laboring class. It is very interesting to find that in New England and New York, where the fertility of native whites was apparently approaching stabilization at a fairly low general level in the period represented by these statistics, the differential between extreme social classes as regards fertility was somewhat narrower than in sections where fertility rates were still high and falling rapidly at this time. This finding strongly suggests that differential fertility among social classes in the United States during recent years has been in part the expression of a lag in the spread of the family limitation pattern. It is highly desirable that extensive studies, with more recent data, should be made concerning fertility trends in this area under different social conditions.

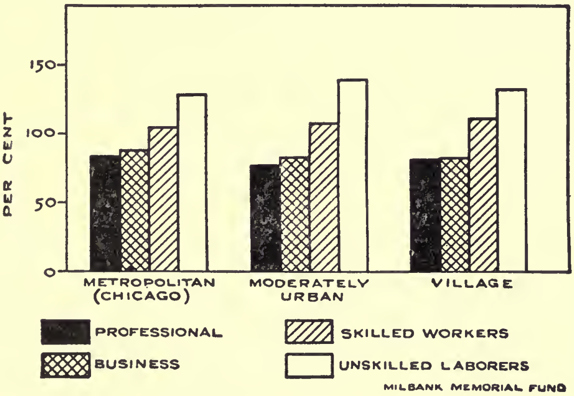

FIG. 24. SIMILARITY OF THE ORDER AND SPREAD OF BIRTH RATES FOR THE SOCIAL CLASSES IN DIFFERENT TYPES OF COMMUNITIES. Milbank sample of 1900 census data. From Kiser, 1932, "Fertility of Social Classes in Various Types of Communities of the East North Central States in 1900," *Journal of the American Statistical Association*, Vol. 27, p. 379. The cumulative birth rate (standardized) for wives under 45 years of age in each social class is shown as a per cent of that for all classes combined in the same communities.

Social class differentials were found to be surprisingly similar in different types of communities, in an analysis of variations in fertility of marriage in 1900 among social classes in one metropolitan area (Chicago), in a group of cities ranging from approximately 50,000 to 125,000 population, in a group of villages with fewer than 5,000 inhabitants, and in rural farm communities, all these groups being located in the East North Central states:

> "First, in each type of community studied an inverse association between fertility and social status was manifested. Second, with the exception of that of unskilled laborers living in moderately urban communities and in villages, the fertility rate of each non-rural social class was lower than that of the farm owners, the least fertile rural class. Third, for each urban social class, fertility was highest in villages, intermediate in urban centers of 50,000–125,000 population, and lowest in Chicago. Fourth, a striking similarity of all communities appears with respect to the range of difference in fertility of component social classes" (Kiser, 1932, p. 374).

These results are very discouraging to those who have hoped that the social class differentials found in large cities would not appear, at least with equal strength, in village groups. There is a real possibility, however, that different results might be obtained in other geographical sections and at other times, especially in view of the consideration that fertility rates for native whites were falling quite rapidly in the population described during the period represented by this study. The study of variations among American communities with regard to differentials in fertility among social classes, and the conditions affecting such differentials offers a large and important field for future research.

8. *Fertility of Farm Families in Relation to Social Status*

There is apparently little difference in rate of reproduction between farm operators and farm laborers, for the United States as a whole (*see* Table 30). The farm laborers as a group have a somewhat higher initial fertility than the operators; but this differential is eliminated, according to our method of estimating net reproduction tendency, by the higher child mortality characteristic of this group. It must be remembered, in this connection, that the farm laborer group includes a large proportion of Negro families. One must also bear in mind that regional differentials are obscured by this analysis and that farm laborers are not evenly distributed through agricultural areas. The low index of fertility shown here for the foreman group refers only to a very small sample, represented by 433 births in 1928; and this sample, which includes "garden, nursery, and orchard foremen," may not be representative of the whole farm foreman group. If the result could be regarded as significant, it would have inferential importance, because with advance in agricultural technique and commercial farming, the foreman group may come to have increasing numerical importance.

Data on the fertility of marriage happen to be available for farm owners, farm renters, and farm laborers in the East North Central division from two different studies (*see* Table 31). These data seem to indicate a social class differential among farm families similar in character, though less in

TABLE 30

Relative Values for Children Born, Children Living, and Index of Net Reproduction for Farmers, Farm Foremen, and Farm Laborers *

	Children Born per Mother Aged 30–39 Years, as per Cent of Corresponding Value for Farmers	Children Living per Mother Aged 30–39 Years, as per Cent of Corresponding Value for Farmers	Index of Net Reproduction per Generation, as per Cent of Corresponding Value for Farmers
Farmers	100	100	100
Farm foremen [a]	74	77	80
Farm laborers	107	103	98

* Based on Table 25.
[a] *See* text for description of sample.

degree, to that found among urban groups. The difference between the results obtained from the Milbank sample by using data for wives aged 40–44 years and by using cumulative birth rates (standardized) based on data for wives at all ages is interesting, but difficult to interpret satisfactorily.[20]

TABLE 31

Relative Values for Average Number of Children Ever-Born and for Size of Family, for Farm Renters and Farm Laborers. Selected Northern Area, 1910, 1930 *

	Milbank Sample, Whites of Native Parentage, Northern United States, 1910		Family Sample, Whites of Native Parentage, East North Central States, 1930
	Children Ever-Born per 100 Wives Aged 40–44 Years [a]	*Cumulative Standardized Birth Rates for Wives of All Ages* [a]	*Children and Parents per Family, Wives Aged 35–39* [a]
	Index [a]	Index [a]	Index [a]
Farm owners	81	90	90
Farm renters	100	100	100
Farm laborers	101	108	109

* Data from Syndenstricker and Notestein, 1930, "Differential Fertility According to Social Class," *Journal of the American Statistical Association*, Vol. 25, p. 25, and from Ogburn, 1933, "The Family and Its Functions," *Recent Social Trends*, Vol. 1, pp. 685–686.
[a] Values for farm renters taken as base (= 100).

Studies of the standards of living of farm families might be expected to supply valuable data on fertility of marriage in relation to economic status. Unfortunately, most standard of living studies, having been made with another purpose in view, do not give sufficiently complete classifications of children by ages to afford exact evidence on fertility. A series of studies in different sections of the country, reported by Kirkpatrick, do meet this requirement quite well. It should be noted that these results are based on studies in New England, the North Central states, Kentucky, South Carolina, and Alabama, and there is no separate analysis by geographic divisions.

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[20] On this subject, *see* Kiser, 1933.

TABLE 32

Specified Items of Income and Expenditures in Farm Families (Immediate Families, Only)[a] of Selected Localities in Eleven States,[b] 1922–1924, in Relation to Numbers of Children in Selected "Age Groups" *

Families Classified According to Numbers and Ages of Children	Number of Families	Average Number of Rooms per House	Average Value per Year					
			House Rent Furnished by Farm	*Goods Furnished by Farm*	*Goods Purchased*	*Expenditure for Advancement*	*Expenditure for Personal Items*	*Insurance*
1 child, aged 6–11, and no other children	64	6.3	$192.70	$569.90	$736.80	$60.60	$38.40	$27.10
2 children, aged 6–11, and no other children	80	6.8	207.00	628.20	836.80	62.60	36.80	37.90
3 children, 0–11 age group	127	6.1	161.80	604.50	794.60	56.10	33.00	26.80
4 children, 0–11 age group	105	6.0	150.70	654.10	757.60	48.20	28.60	34.00
5 children, 0–11 age group	67	6.8	159.70	714.30	861.30	73.40	36.50	54.70
6 children, 0–11 age group	85	6.3	148.40	805.00	923.60	72.20	29.70	45.90

* Adapted from Kirkpatrick, 1926, *The Farmer's Standard of Living*, p. 37. The age groups used in this table are selected from total array presented by Kirkpatrick in order to represent, so far as possible, variations in fertility. The children in a family are classified, as a total group, into specified age groups, although in some cases children above or below the exact limits of the group may be included.

[a] "Only those households consisting of members of the immediate family supported from the family purse, 1,662 in number, are included. All households having hired helpers, boarders, relatives, or others housed or fed at the family table during all or part of the year of study are excluded." This procedure may bias representation at higher income levels.

[b] New Hampshire, Vermont, Massachusetts, Connecticut, Kentucky, South Carolina, Alabama, Missouri, Kansas, Iowa, and Ohio. See text for further explanation.

It will be noted that in the table given above there seems to be a pronounced negative relationship between number of children and value of house, but no apparent relationship between number of children and total income, or between number of children and amounts spent for "advancement," "personal items," or "insurance." This peculiar result can probably be interpreted by reference to the regional distribution of the families studied, the largest numbers being from Alabama and from several North Central states. House values are low in the South. If we assume that the Southern families were larger, but that otherwise no differential is indicated, the results become at least self-consistent. The net effect of these data then is to suggest the absence of any pronounced difference in size of family between farm families in relation to family income.

Data on size of family in relation to social status of parents are reported for 58 completed families and for 66 uncompleted families in New England villages, by Conrad and Jones. These authors found negligible correlation between size of family and social status in the case of completed families, although a negative partial correlation, with age of eldest child held constant, appears between size of family and social status in the case of uncompleted families ($r = -.30$). These findings may possibly be influenced by rural-urban migrations, if selective for social status or for size of family or both. Furthermore the small size of the samples causes doubt about the significance of the result.

The absence of differential fertility among native white Protestant farm families in New England is again indicated in a report by Whetten, 1933, based on a house-to-house canvass of 616 rural families in Connecticut. When families with foreign-born or Roman Catholic members and families engaged in any occupation other than farming are omitted, the average number of children (2.64) reported by 120 parents with only elementary schooling is found to be practically identical with the average number of children (2.65) reported by 57 parents with high school or more advanced education—limiting the comparison to completed families.

Social class differentials among farm families appear, however, in parts of the South, —e.g., in cotton-growing counties in Oklahoma.[21]

TABLE 33

Correlation Between Selected Variables for 63 Oklahoma Cotton-Growing Counties *

Items Correlated	r
Value of buildings per farm *and* per cent of land planted to cotton	−.54
Value of buildings per farm *and* per cent of farm tenancy	−.40
Per cent of land planted to cotton *and* per cent of farm tenancy	.71
Per cent of land planted to cotton *and* per cent of illiteracy	.43
Per cent of land planted to cotton *and* per cent of persons aged 16–17 years in school	−.61
Per cent of farm tenancy *and* per cent of illiteracy	.33
Per cent of farm tenancy *and* per cent of persons aged 16–17 years in school	−.64
Per cent of land planted to cotton *and* children under 7 years per 1,000 total population	.49
Per cent of farm tenancy *and* children under 7 years per 1,000 total population	.37
Per cent of farm tenancy *and* children under 7 years per 1,000 total population, *if* per cent of land planted to cotton and per cent of urban population are held constant	.53

* Abstracted from McCormick and Barney, 1932, "Farm Tenancy and Social Factors, a Study in Oklahoma," *The American Journal of Sociology*, Vol. 37, pp. 589-590.

A high proportion of children in these counties is clearly associated with cotton production, and with farm tenancy, and probably also with low values of farm buildings and with illiteracy. This relationship may be influenced by a tendency for older couples to occupy the better lands, as owner-operators. Thus, it is possible that a part of the apparent relationship between farm tenancy and fertility, suggested here, may be spurious. But somewhat higher fertility seems quite clearly to be indicated here for the areas occupied by very poor cotton-farm tenants than for other areas.

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[21] Fertility of native white women is similar in Oklahoma, Virginia, Georgia, and Louisiana.

A more intensive, but less extensive, treatment of the same situation is available in a field study of economic and social conditions among cotton farmers, in this region. Limiting their analysis to families of couples married twenty years or more, Duncan and Sanders (p. 14) report an average of 5.4 children ever-born for owner families (275 cases) and an average of 5.9 children ever-born for tenant families (306 cases)—with equal average loss by deaths of young children (0.4 children per family) for both groups. The average number of children ever-born (5.3 children) in the families of 34 croppers, the lowest subclass within the tenant group, was much lower than for the tenant group as a whole, but the small size of the sample makes it impossible to attach much significance to this result.

The present writers, developing a method initiated by O. E. Baker of the Bureau of Agricultural Economics, have explored the relationship between effective fertility of farm populations by counties, and average value of farm products (or average value of farm), using 1930 census data.[22]

The farm population of New York may be grouped, by counties, in three main divisions, as follows:

1. *The 35 counties with average value of farm, 1930, listed as less than $8,000.* This group comprises most of the dairy counties in the central portion of the state, the Adirondack region, and the northern counties near the St. Lawrence River. The ratio of children under 5 per 1,000 women aged 15–44 years for these counties, combined, is 473.

2. *The 16 counties with farm values ranging between $8,000 and $16,000.* This group is composed chiefly of western fruit and grain counties near the Great Lakes, together with 3 counties in the southern tier (also containing fruit farms). The corresponding ratio of children to women in these counties, combined, is 410.

3. *The 6 remaining counties which contain rural-farm areas, located in the proximity of New York City.* The average value of farms in each of these counties is over $16,000, and in most cases over $24,000. There is a fairly large foreign element in this truck-farm area, 18 per cent of the rural-farm population being foreign born, in contrast to 9 per cent of the rural-farm population of the whole state.[23] But in spite of this fact, the ratio of children to women for these counties, 398, is slightly lower than in either of the other

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[22] The figures for average value of farm for North Central states are for total goods sold or used by farm families for the year 1929, which was a fairly normal year as regards farm products in this area. In the treatment of data for the Southern states, where analysis by race is important, it is necessary to substitute figures for average farm values in 1930, because data on farm incomes are not given separately for white and Negro operators.

The influence of urban centers on some farming areas in New York State made it appear futile to attempt to apply the same method to this state. The farm population in New York is therefore merely divided into three broad classes.

[23] The proportion of native white persons of foreign parentage in the rural-farm population of these six counties is 29 per cent; the corresponding value for the rural-farm population of the whole state is 21 per cent.

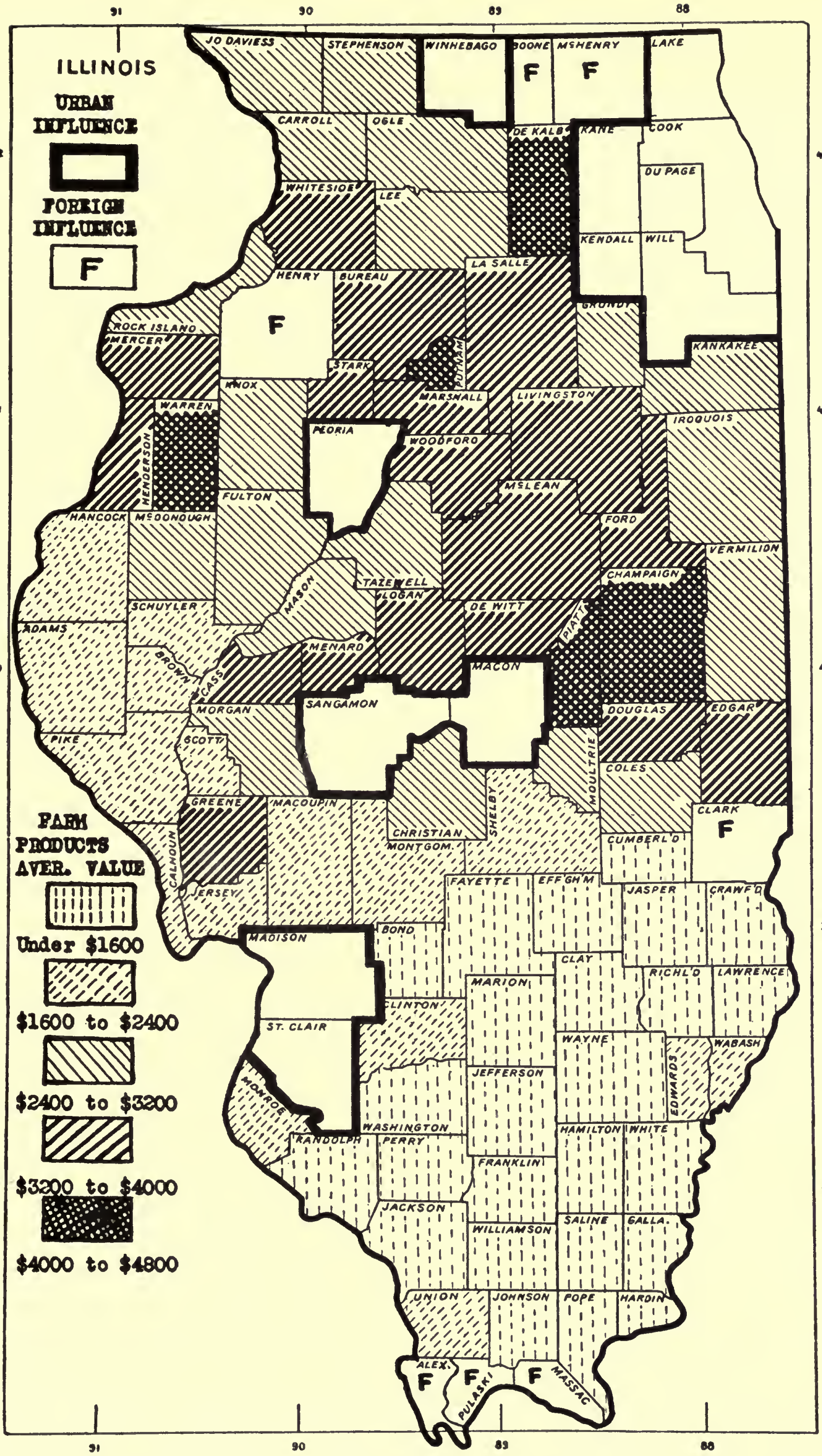

FIG. 25. MAP SHOWING ILLINOIS COUNTIES CLASSIFIED BY AVERAGE VALUE OF PRODUCTS PER FARM, 1929. Data from the Census.

two main divisions. It would seem to be plausible to attribute this ratio, which is low in comparison with other farm groups in the United States, chiefly to the influences of metropolitan ways of living, rather than merely to the high average value of farms in this area.

In treating the data for farm populations in other states, separate classification is made for "areas of special urban influence" and "areas of special foreign influence." All counties with cities above a specified size, and all counties adjoining a metropolitan area are put in the former category. Counties in which more than 10 per cent of the rural farm population in 1930 were of foreign birth are put in the "foreign influence group," in the case of Illinois, Iowa, and Nebraska. In North Dakota a majority of counties would have been excluded on this criterion, so only counties in which more than 20 per cent of the rural farm population were of foreign extraction are given separate classification in this case. The distribution of classes of counties in Illinois is shown in Figure 25.

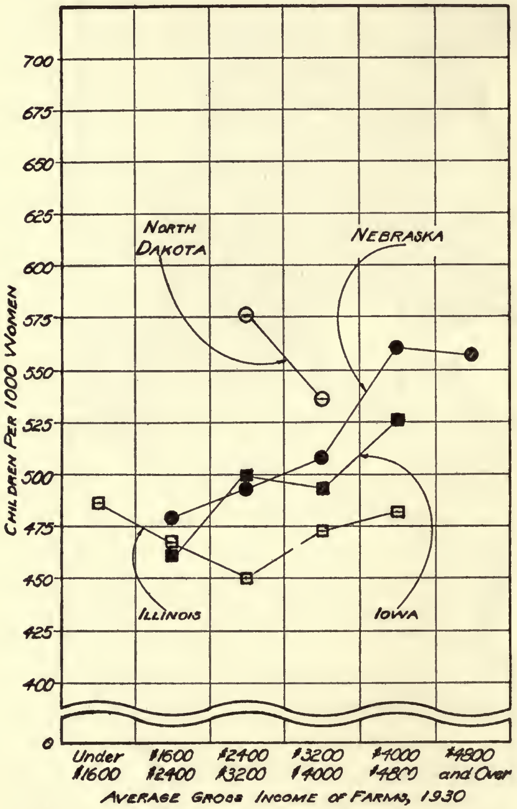

FIG. 26. AVERAGE NUMBER OF CHILDREN UNDER 5 YEARS PER THOUSAND WOMEN AGED 15–44 YEARS ON FARMS IN COUNTIES WITH SPECIFIED AVERAGE GROSS INCOME PER FARM, SELECTED NORTHERN STATES, 1930. Data given in Appendix K.

In Illinois, a group of counties with low average farm incomes in the southern part of the state is characterized by high effective fertility. The illiteracy rate for native whites is also higher than average in this section of the state, and rejection rates for mental deficiency at the time of the war were also higher than average for some of these counties. On the other hand, high ratios of children to women are also found in some of the most prosperous farming counties in central Illinois. But high percentages of tenants and laborers are included among farm workers in these counties; and we have already noted that in this general region higher fertility rates have been reported for farm tenants and laborers than for farm operators. A similar rise in fertility with increased average farm values also appears in several other states studied here, especially in Nebraska. But again we must note the special circumstance that in Nebraska many of the counties with the highest annual yield per farm are cattle-raising counties, divided into large holdings. However, even after taking these circumstances into account, it would appear that in the North Central states the effective fertility of the rural farm population in the most prosperous areas has been maintained at a level as high as that found in counties of only medium productivity.[24]

The situation is quite different in the two Southern states here studied, North Carolina and Alabama. The relationship between effective fertility and economic status is here marked by a straight line, fertility declining as one proceeds from low value to high value counties. The situation, however, may be regarded as very similar to that found in Northern states where a rise in fertility is indicated in retarded areas. Only a few sections in the South have average farm values that are as high as the values in the North Central region.[25] In other words, the relationship between fertility and economic status observed in the white rural-farm population of Southern states conforms to the graduated rise in effective fertility expected in farm groups with retarded development.

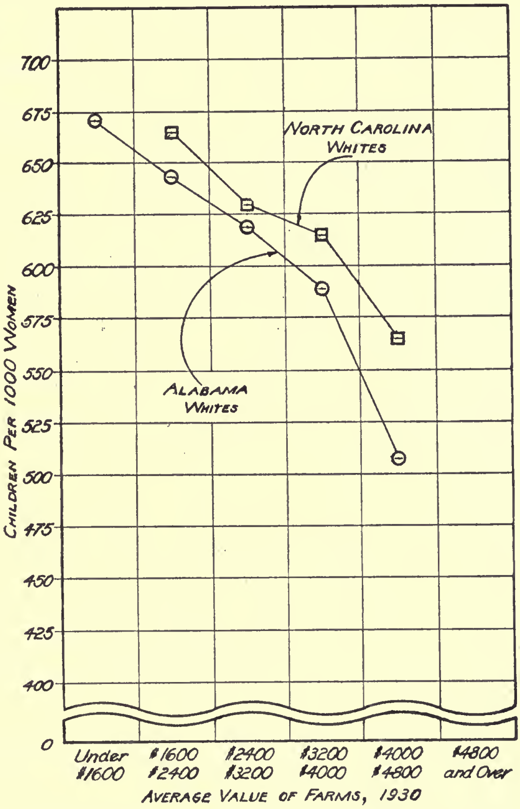

FIG. 27. AVERAGE NUMBER OF CHILDREN UNDER 5 YEARS PER THOUSAND WOMEN AGED 15–44 YEARS FOR WHITES ON FARMS IN COUNTIES WITH SPECIFIED AVERAGE VALUE OF FARM, SELECTED SOUTHERN STATES, 1930. Data given in Appendix K.

No significant relationship appears between ratios of children to women in rural-farm Negro populations, by counties, and average value of farms operated by Negroes, either in North Carolina or in Alabama. Distinctly higher ratios of children to women, however, are generally found for farming

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[24] *See* Appendix K.

[25] In classifying farms by average value in the Southern states, $4,000 represented the highest lower limit that would yield an adequate sample. This limit, $4,000, as the average value per farm, would have excluded almost all of the counties in the Northern series except those in southern Illinois and a few counties in the Adirondack region in New York state.

Negroes in North Carolina than for farming Negroes in Alabama—but the writers do not know what significance, if any, should be attached to this finding.

Reviewing the materials presented in this section, we conclude that within any fairly homogeneous area, variations in fertility in relation to economic status among farm families are likely to be fairly negligible, except for the high fertility characteristic of very undeveloped or retarded farming communities. In other words, above a certain moderate level of rural prosperity, there seems to be little or no significant relationship between economic status and fertility among farm families.

New developments in agriculture tending toward commercial farming, on the one hand, and toward subsistence farming on the other hand, may introduce new forces. It is possible, however, that if subsistence homesteads are clustered in the vicinity of small-town industrial establishments, and supplied with progressive educational and public health facilities, the fertility of the subsistence farm units may be held at the level of effective fertility prevailing in the main areas of agricultural productivity. These new developments deserve much closer scrutiny, from the standpoint of differential reproduction trends, than they appear to be receiving just now.

9. *Secular Trends in Differential Fertility in the United States*

It is not possible to show such interesting changes at different times in the relative fertility of social classes in American cities as have been found in Europe. Our statistics on this subject do not reach back very far, and if there are now any large urban populations in the United States which are not characterized by the usual social class differential they have not yet been discovered.

The proportional decrease in the frequency of large families among whites in the Northern United States during the last quarter of the Nineteenth Century was about the same in all urban social classes. This is shown in Table 34, by comparing the average size of family in different occupational classes as reported by wives aged 40–44 years in 1910, and as reported by wives aged 60–64 at the same time. The fertility of the former group must have been centered somewhere in the decade 1890–1900, and that of the later group twenty years earlier in the decade 1870–1880.

The differential among urban social classes again seems to have remained fairly constant, in the North Central division at least, in the period covered by data on fertility reported by native white wives under 45 years of age in 1900 and in 1910 (*see* Figure 28). It appears that among native white families of native parentage in this area at this time birth rates were falling more rapidly in urban areas than in rural areas. Among urban social groups, however, the differential in fertility appears to be remaining fairly constant, with sharp declines in fertility rates both for the families of professional workers and for the families of unskilled workers. There is some doubt about the

TABLE 34

Percentage Distribution of Occupational Groups in Two Successive Generations by Size of Family, Milbank Sample of 1910 Census Data *

Occupations of Husbands and Ages of Wives	Number	Per Cent Reporting Specified Numbers of Children Ever-Born						
		0	*1*	*2*	*3*	*4*	*5 or more*	*Total*
Professional								
60–64	354	14.7	13.3	19.8	15.5	14.1	22.7	100
40–44	1,296	19.8	19.6	24.5	18.4	9.6	8.2	100
Difference	—	+5.1	+6.3	+4.7	+2.9	−4.5	−14.5	—
Business								
60–64	762	9.6	14.0	21.1	16.7	13.0	25.5	100
40–44	3,043	17.9	21.5	22.9	17.1	9.7	10.9	100
Difference	—	+8.3	+7.5	+1.8	+0.4	−3.3	−14.6	—
Skilled								
60–64	444	8.8	13.3	16.7	15.5	12.2	33.6	100
40–44	1,902	17.4	17.0	18.0	16.2	11.0	20.5	100
Difference	—	+8.6	+4.3	+2.7	+0.7	−1.2	−13.1	—
Unskilled								
60–64	137	4.4[a]	12.4	12.4	16.8	13.1	40.8	100
40–44	423	16.3	14.9	16.1	14.4	9.9	28.4	100
Difference	—	+11.9[a]	+2.5	+3.7	−2.4	−3.2	−12.4	—
Farm owner								
60–64	1,709	9.0	8.8	11.8	14.8	12.7	43.2	100
40–44	3,488	10.6	10.1	16.6	16.4	13.2	33.1	100
Difference	—	+1.6	+1.3	+4.8	+1.6	+0.5	−10.1	—

* Adapted from Notestein, 1931, "The Decrease in Size of Families from 1890 to 1910," *The Quarterly Bulletin of the Milbank Memorial Fund*, Vol. 9, pp. 181–188.

[a] The number of wives aged 60–64 in the unskilled group is small. The apparent very low frequency of childless women in this group may therefore be merely a chance variation.

proper interpretation of the apparent rise in the fertility of farm laborers indicated by this analysis.

More recent data on variations in fertility among native whites of native parentage in the East North Central division are supplied by Ogburn's analysis of changes in size of primary family (husband, wife, and children) reported in *Recent Social Trends in the United States*. Again, we find no indication of any narrowing of the social class differential in fertility in this area —if size of primary family can be regarded as an index of fertility. On the contrary there is some indication of a further widening of this differential:

> "The changes in the number of persons per family between 1900 and 1930 varied markedly among the different groups. The greatest decline was among the families of the professional group, where it was 10 per cent. The proprietary group was next with a 6 per cent decline and the clerical group followed with a decrease of 5 per cent. The families of the skilled and semi-skilled workers showed a decrease of 3 per cent, while those of the unskilled decreased by 1

per cent. The families of the farm owners also decreased 1 per cent, but the families of the farm renters and of the farm laborers increased, the former by 5 per cent and the latter by 13 per cent. Among families with wives in the same age group, 35 to 39 years, the families of the farm owners and of the farm renters declined somewhat in average size, although the farm laborers did not follow this trend" (1933, p. 686).

It should be noted that this comparison is based on numbers of parents and children per family, in all families with wives under 45 years of age.

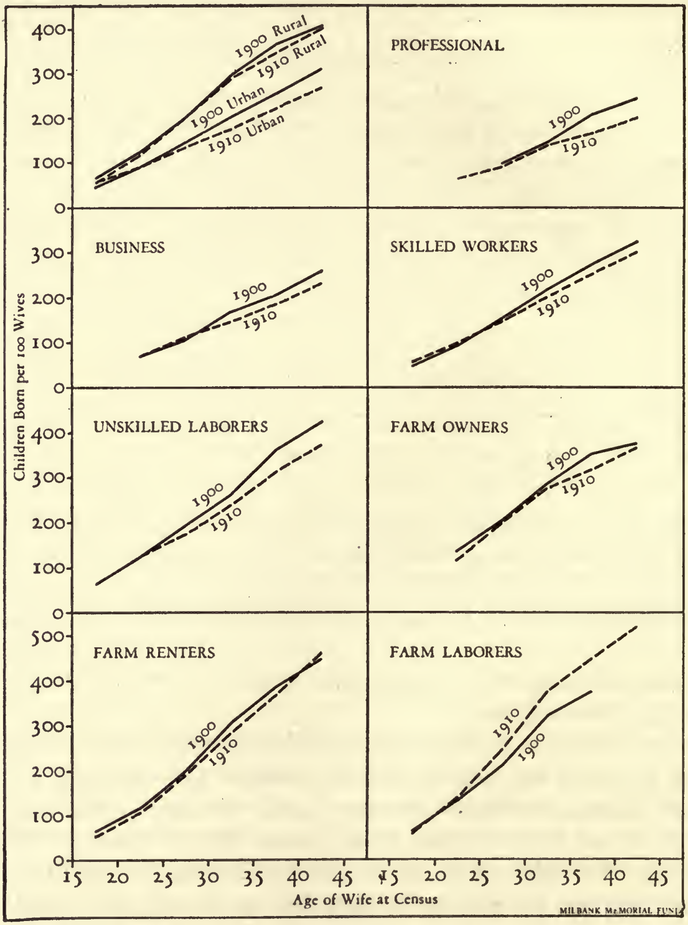

Fig. 28. Cumulative Fertility Rates (Children per 100 Wives in Each Quinquennial Age Group) for Rural and Urban Areas and for Specific Occupational Classes, North Central States, as Reported in 1900 and in 1910. Milbank sample of census data. From Kiser, 1933, "Trends in the Fertility of Social Classes from 1900 to 1910," *Human Biology*, Vol. 5, p. 266.

For this reason, the average number of children per family would appear less at the later date in any grouping now tending to marry at earlier ages than formerly but to remain childless for a few years after marriage, although this might not involve any decrease in the average number of children finally born per family in this group. Because of this consideration we cannot be sure that the true differential in effective fertility among occupational classes in this area has actually widened during the last thirty years, as the figures seem to indicate. However, it seems clear that no tendency toward a decrease in differential fertility among social classes is yet indicated in the old native white population of the East North Central states. The situation may be different in other parts of the country, but unfortunately we have no extensive data on the subject for any other section.

10. *Conclusions*

There is no doubt about the existence of large differentials in the fertility of marriage among social groups, classified by occupation or by economic status, in the United States at the present time. Moreover, large differentials in net reproduction rates remain after adequate allowance had been made for differences in survival rates, although the latter are in general negatively correlated with fertility rates.

It is impossible to take variations in marriage frequencies among different social classes accurately into account, on the basis of data now available. It is possible but by no means evident that if this could be done the true reproduction rates of the unskilled and dependent groups would approach the corresponding rates for other groups of manual workers; but the large differences in reproductive tendency between the manual group and the business and clerical group would remain; and it is possible that the differential between the latter group and the professional group might be somewhat widened if differences in marriage frequencies could be properly taken into account.

Differentials in fertility rates among urban social classes have apparently remained fairly constant during the last fifty years, although the absolute rates for all classes have declined considerably during this period, and although the differential between rural and urban groups within the native white population seems first to have widened and then to have begun to narrow during this period.

Differentials in fertility among social classes in various parts of the United States, and in communities of different sizes are surprisingly similar. But no extensive data on regional comparisons are now available for any period after 1910. At that time the social class differentials among native whites appeared to be slightly lower in the Northeastern states, where general fertility rates for native whites were approaching stabilization, than in other parts of the country.

It seems very likely that differentials in fertility among social groups in the United States may become somewhat narrower in the course of the next fifty years. However, anticipating the results of a study of the causes of variations in fertility (*see* Chapters XI and XII), the present writers consider it improbable that these differentials will be levelled off or reversed in this country in the visible future, unless extensive public measures are undertaken to produce this result.

No large differences in effective fertility in relation to economic status are indicated at present for rural-farm families living within the same farming area, except for the very high fertility characteristic of undeveloped rural areas.

Taking for granted the existence of a generally negative relationship between reproductive tendency and social status as a demonstrated fact, the interest of the research worker is now centered in studying the causes of this relationship and in explaining the exact conditions which tend to cause the diminution, disappearance, or reversal of this relationship in different situations.

PART II

MEASURABLE CHARACTERISTICS OF AMERICAN GROUPS

CHAPTER V

VARIATIONS IN PHYSICAL DEVELOPMENT AND HEALTH AMONG AMERICAN GROUPS

In the preceding chapters we have reviewed the fertility and reproduction rates of different sections of the American population and found that they vary to a quite extraordinary degree. Some large groups are increasing at the rate of 50 per cent or more in a generation; others show a tendency toward natural decrease by as much as 30 per cent per generation. If the people composing these different groups were all exactly the same, these variations in reproductive tendency might have important economic consequences, but they would not have "qualitative" effects on the social or biological heritage of the nation. But if people composing these groups differ in their personal characteristics, either as a result of the surroundings and environment in which they were brought up and in which they will in turn bring up their children, or as a result of differences in hereditary constitution, then their differential rates of increase may seriously affect the future development of the nation.

A consideration of the individual characteristics of the various population groups whose differential rates of reproduction we have just been studying is therefore of critical importance. The interest attaching to such a study is of course very great, but its interest is perhaps exceeded by its difficulty. Health and vitality, moral vigor and intellectual ability, have often been studied by making personal observations. Indeed, no other method provides such personal satisfaction. It requires the minimum of expense and effort, it allows broad freedom to the emotional bias which we may be all too unconscious of possessing, and it gives pleasure to all those who share the same bias. It is, therefore, with some real regrets that we embark on a study of a different kind and ask the reader's patience while he explores with us those characteristics which are of interest but which at the same time are measurable in at least a moderately scientific sense. Even with this limitation and with the most honest of intentions, it will not be easy to obtain a result free from personal bias, for we are dealing here with topics which touch deeply the basic racial, social, and local prejudices of mankind. Therefore, when we come to deal with intelligence, we will use as much exact psychological material as possible, even at the risk of a considerable demand upon the reader's attention. In dealing with physical characteristics, however, an equally systematic treatment does not seem to be warranted at present, for reasons which we will state immediately.

Variations in physical development and health appear to be the most obvious, most easily measured, and most capable of objective treatment. But the significance of such variations among American groups, considered with reference to population policy, seems to us at present to be quite negligible. It is, of course, an easy matter to note differences between groups in anatomical traits, life expectation, and the incidence of certain diseases. But aesthetic preference for certain bodily proportions hardly affords an adequate basis for radical social action. And there is little premium in our civilization on mere bulk and brawn. Health is a matter of major concern. But, after a fairly extensive investigation of the subject, the present writers are convinced that at present there is not sufficient evidence of important variations among large groups in the United States as regards the hereditary basis of health and longevity to constitute a proper basis for any selective population policy.

There is, however, clear evidence that heredity is a very important cause of individual variations in health and longevity, and that some serious diseases are largely determined, or at least conditioned, by genetic factors. Eugenics, as a phase of public health and medical practice, is apt to assume increasing importance with further advances in medical science and further studies in human genetics.[1] But the high proportion of recessive characteristics among pathologic traits and the degree to which apparently similar defects may be caused by different factors make the problems in this field very complex. Any considerable improvement in the physical well-being of the race through eugenic selection will necessarily be a slow process, although it may ultimately occur, and with great benefit. Many phases of this subject are now obscure, but rapid progress is being made through the convergence of many lines of research, including cytology, biochemistry, nutrition, experimental immunology, research on blood groups, studies of twins, linked inheritance, and the statistical treatment of pedigree records. These lines meet in a broad field which is the common ground of genetic research and medical science. As workers in these fields come into agreement on the possibilities of "genetic therapy," to use Hogben's term, public health programs will be formulated in line with their findings.

In view of these considerations, the present chapter will be limited to a few notes on variations among American groups in physical development and health, intended to give the layman a preliminary orientation in this field. Readers are referred, for further study, to various reports on related topics, listed in the bibliography.

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[1] For brief statement of the relation of heredity to disease, *see* Lewis, 1930, "The Inheritance of Disease," in *Human Biology and Racial Welfare.* For critical treatment of the possibilities and difficulties of eugenic selection, *see* Holmes, 1933, *The Eugenic Predicament*, and Hogben, 1933, *Nature and Nurture.* For consideration of eugenic selection in relation to problems of hearing and sight, by medical and social workers in these fields, *see* National Research Council, Committee on the Physical Causes of Deafness, 1928, "The Physical Causes of Deafness"; White House Conference on Child Health and Protection, Committee on the Physically and Mentally Handicapped, 1933, "The Deaf and Hard of Hearing," in *The Handicapped Child;* Union of Counties Associations for the Blind (England), Prevention of Blindness Committee, 1933, *Report;* and Best, 1934, "Blindness and Heredity," in *Blindness and the Blind in the United States. See also* Blacker, Editor, 1934, *The Chances of Morbid Inheritance.*

The range of variations in physical traits among American groups is well illustrated by the abundant data on such gross characteristics as height and weight, or by various indices of body build. The largest mass of data on the dimensions of adults in the United States is derived from the routine examinations of men during the World War, supplemented by a special examination of a large sample, classified by racial and national origin, at demobilization. Variations in stature, in chest circumference relative to height, and in weight relative to height (squared), as indicated by the army data, are shown here for groups classified by race or nationality and by place of residence (Figures 29 and 30). It is easy to see that variations among state populations are strongly influenced by racial composition. This accounts for the grouping of New Jersey, Massachusetts, New York, Penn-

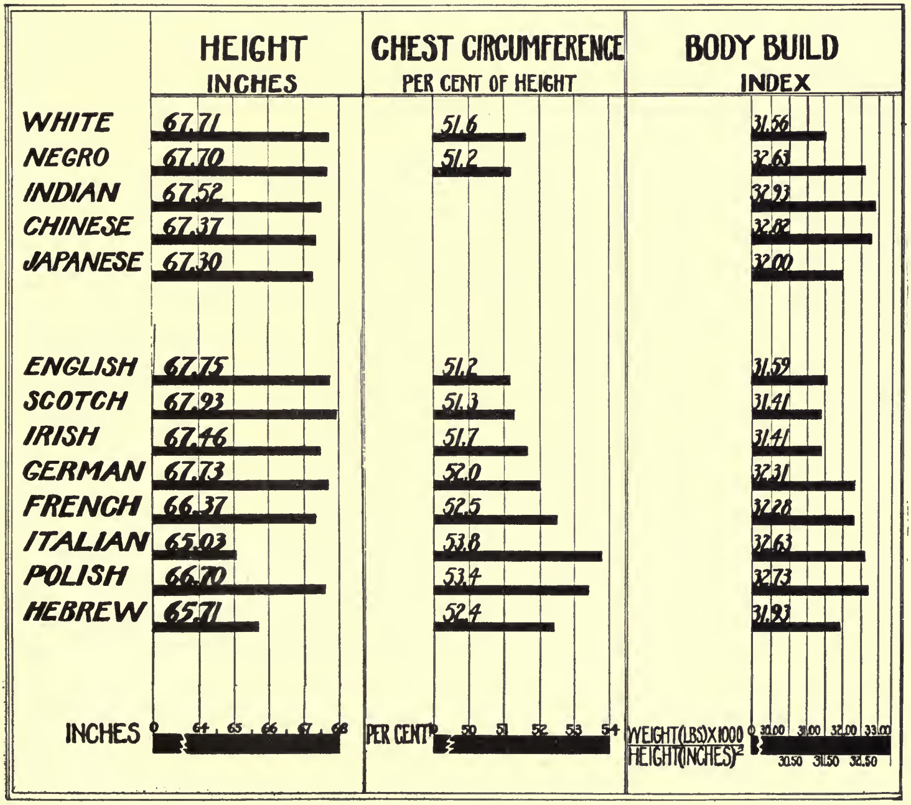

FIG. 29. COMPARISON OF HEIGHT, RELATIVE CHEST CIRCUMFERENCE, AND BODY BUILD INDEX OF WORLD WAR RECRUITS AT DEMOBILIZATION, BY RACIAL AND NATIONAL GROUPS. Data from Charles B. Davenport and Albert G. Love, 1921, *The Medical Department of the United States Army in the World War*, Vol. 15, Part I, *Army Anthropology*, pp. 113, 117, 154, 156, 173, 174.

sylvania, Connecticut, and Rhode Island at one extreme. Inasmuch as Negroes happen to be approximately equal in average stature to whites, the presence of Negro elements in any state population does not cause the average for the total population to differ much from the average expected for the white population alone. The presence of Negroes may lower the average somewhat in the case of a state population composed of Old American stock

TOTAL AND PROPORTIONATE MEASUREMENTS BY STATES (P.)

HEIGHT WITH RELATIVE WEIGHT AND CHEST (EXP.)

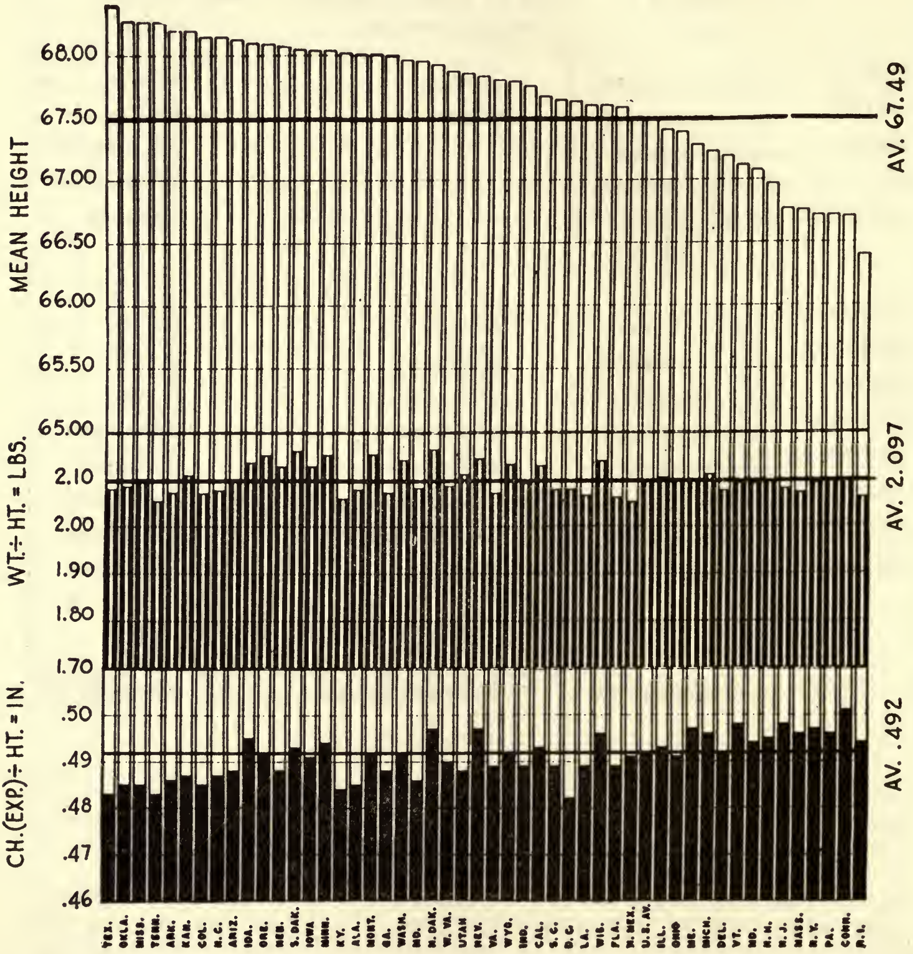

Fig. 30. Comparison of Height, Relative Chest Circumference, and Weight Relative to Height, Men Drafted for the World War, by States. From Charles B. Davenport and Albert G. Love, 1921, *The Medical Department of the United States Army in the World War*, Vol. 15, Part I, *Army Anthropology*, p. 178.

and Negroes, because Old Americans like the English, Scotch, and Germans from whom they are mostly derived, and like the Scandinavians, are distinctly taller than most of the Southern and Eastern European peoples.

In general, the shorter peoples tend to be somewhat stockier. This is especially noticeable in the case of the Poles. But examination of the chart presented above shows that this relationship does not always hold. In the case of the Negroes the ratio of weight to height (squared) is distinctly higher than the ratio of chest to height, in comparison with other races.

Wissler, 1924, has mapped the army data on these characteristics (height, chest circumference relative to height, and index of body build) by smaller geographic sections, with separate classification for several large cities and for more or less isolated mountain or coastal areas. Only three sections show mean statures over 68.5 inches; all three are mountainous areas, peopled by old native stocks of British extraction—in North Carolina, Arkansas, and Missouri. Only two sections show mean statures below 66.5 inches; namely, New York City, and Rhode Island, each containing large groups of peoples characterized by short stature, including Italians, Hebrews, or French Canadians. High variability in anatomical traits is usually regarded as an index of racial heterogeneity. It is, therefore, interesting to note that only 23 out of the 158 sections used in this analysis show variability in stature as high or higher than the average variability for the national population as a whole. High variability in stature, as might be expected, is found in most large city populations.

It appears that the classes which enjoy superior social status are almost universally taller than less favored groups. Sorokin (1927) and Sorokin and Zimmerman (1929) have assembled a mass of materials to this effect. Sorokin concludes, "There is a tangible correlation between high stature and high social class, on the one hand; between a low stature and low social class, on the other hand, providing social classes of a given society are taken into consideration. There are reasons for believing that this correlation is characteristic, not only of present civilized societies, but also, it seems, of former and less-civilized societies" (p. 222). Differences of this sort in physical development among children in different social classes in the United States have been amply demonstrated in many studies (*see* Boas, Stoke, and others).

Interestingly enough, the secular change during the last century in the anatomical charactistics of some groups has been as great as the variation commonly found among large groups in the United States at the present time. Impressive evidence to this effect is supplied by a Harvard investigation, supplemented by comparable data from several other studies: Bowles, 1932, *New Types of Old Americans at Harvard.* Bowles found an average increase in stature of .03 inches a year in the Harvard series, resulting in a total increase in average stature of about two inches during the last sixty-year period. A similar secular trend is found for women students in American colleges. Significant but somewhat lower rates of increase in stature are evidenced for the Scandinavian people and for Italians; but increases at rates well above that for the Harvard students have been recorded for Dutch and Swiss military conscripts, considered over long periods. Rapid increase during the last half century is also evidenced for Japanese in Japan. Bowles also reports secular comparisons for many other anatomical dimensions. Decrease in other measurements relative to stature appear in many cases, and in a few cases absolute decreases appear. The investigator points out that not all of the changes that have been taking place in the bodily proportions of Old Americans are favorable to health and vigor. The increases in most anatomical measurements, however, are very striking. The accompanying diagram represents a comparison of average measurements for fathers and for sons, where students' measurements are available for fathers and sons who have been Harvard students.

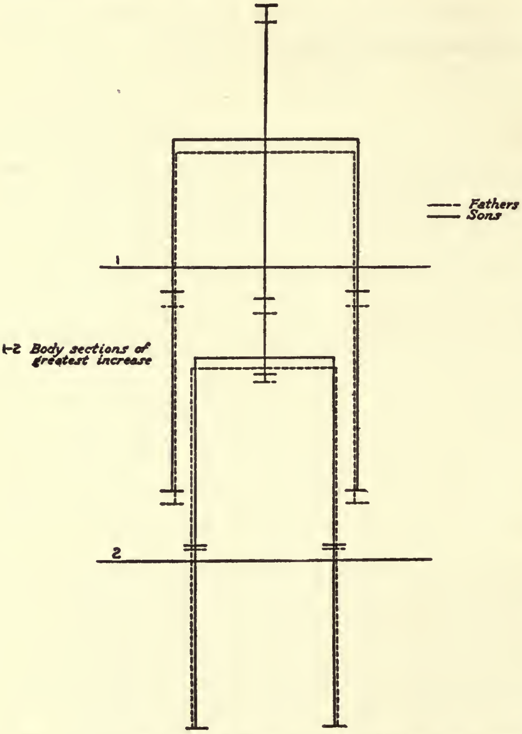

FIG. 31. INCREASES OF VARIOUS BODY PARTS OF SONS OVER FATHERS. From Bowles, 1932, *New Types of Old Americans at Harvard*, p. 50. Bodily proportions of sons (unbroken line) are superimposed on those of fathers (broken line). Average increase in stature is 1.4 inches. Average increase in weight is 10 pounds. The greatest increase is in the middle of the body, including lower segments of upper limbs, upper segments of lower limbs, and the lower part of the trunk. Decrease appears in hip breadth and in head breadth. There is, however, some increase in hip girth; but there is greater increase in girth of upper segments of trunk and upper sections of arms and legs.

All competent authorities recognize the importance both of hereditary and of environmental factors in determining growth and physical development. Hereditary racial differences and variations among families in physical traits are obvious. But the determination of the exact rôles of hereditary and environmental factors in affecting variations in particular traits among particular groups under particular conditions becomes an extremely intricate task. In the first place, variations in specific growth curves for particular organs must be taken into account in all studies of factors affecting growth. Different types of growth curves are characteristic of different bodily organs (*see* Harris, Jackson, Paterson, and Scammon, *The Measurement of*

Man). In the second place, growth curves for particular races must be taken into account in studying particular traits. Such specific racial growth curves are shown by Wissler, 1930, using Sullivan's data on physical measurements of children of different races living in Hawaii. Several of these considerations are summarized in the following brief statement by Boas, 1923:

> "1. . . It is not possible to establish a physiological age of individuals by means of the observation of a single feature because each physiological function has its own characteristic correlation to the chronological age of the individual, and it is possible to form a correct judgment of the general physiological development of the individual, only by taking into consideration all the different conditions of physiological development which are reached by the various organs of the body.
>
> "2. The difference between the growth curves of different European types are small as compared to the variations that may be brought about by different social environments, but beginning with adolescence the effect of the hereditary growth curve makes itself felt and outweighs the environmental effect.
>
> "3. In all probability each racial type has its own growth curve" (p. 308).

Finally, students of nutrition have shown that variations in items of diet (calcium content, for example) may have different effects under certain conditions. A moderate change in diet under some conditions may have no measurable effect either on bodily proportions or on tissue formation; a variation of the same amount under different conditions, or a variation of the same sort but in greater degree, may have no effect on bodily proportions, but may appreciably affect the composition of tissues; again, a variation in the same item under different conditions, or in different degree, may cause a retardation in growth but have no final effect on adult structure; finally, a variation of the same kind under different conditions may cause severe dwarfism (*see* Booher, 1928, *The Calcium Content of the Body in Relation to That of the Food.* Other references in Bibliography.) Such considerations reveal the complexity of the interaction between nature and nurture in the development of different traits in different strains.

The physical characteristics of "Old Americans," as a racial stock, were described in detail by Hrdlička in 1925, on the basis of a series of studies running from 1910 through 1924. This investigator took birth in the United States of all four grandparents as his criterion of selection, excluding any abnormal or unhealthy individuals, so that his figures are representative for normal, healthy Americans of the third generation.[2] The mixed character of this Old American stock is well indicated by Hrdlička's data on complexion and cephalic index. About one-fifth of Hrdlička's subjects had pure blue eyes; a few had light gray or green eyes; nearly one-fifth had pure brown eyes; and slightly more than half were classified as "mixed" types, as regards eye color. Contrasting Old Americans in this country with English in England, Hrdlička concludes, with regard to color of hair, "The Old Americans have apparently less real blonds and certainly less darks and blacks as well as reds, with more blends or intermediates" (p. 50). A similar comparison is made in the case of eye color. It must be remembered, of course, that the English are racially a very mixed group, although apparently somewhat less so than "Old Americans." Hrdlička found that only about 16 per cent of the males and about half as many of the females in his series were dolicocephalic (with a ratio of head-breadth to head-length less than .75); that more than half of the males and just half of the females were mesocephalic; and that 22 per cent of the males and 42 per cent of the females were brachycephalic (with a ratio of head-breadth to head-length of .80 or over) (p. 160).

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[2] At the Smithsonian Institution 247 adult males and 210 adult females were given complete measurements. These constitute the "Laboratory Series." This sample was supplemented, in the case of the males, by complete measurements of 347 Southern draft recruits in an Engineering Corps (referred to as "mechanics," or "engineers"), and 133 Tennessee Highlanders. The persons measured at the Institution were largely drawn from the families of business, clerical, and professional workers residing in or visiting Washington. In the study of the pigmentation of hair, eyes, and skin of Old Americans, 1,009 males and 914 females were examined.

Hrdlička does, nevertheless, believe that the Old Americans whom he examined show the emergence of a national type:

> "The Old Americans are seen to represent on the one hand a group of still considerable variability, but on the other hand a group that already comes closely to deserving the characterization of an anthropological unit. In other words, the 'melting pot,' while its work of unifying the many component elements is evidently not yet completely finished, has nevertheless advanced so much in that direction that the stock possesses already a moderately distinctive character.
>
> "The Old American stock, as it may now be called, stands in general nearer than any other branch of the whites to the stock of Great Britain. But it is not, or no more, identical with the same; it is American. There is some justification therefore in speaking of the 'American type' of white people. This is near the English, Irish and Scotch types, but is at least as different from any of these as these are different from each other" (p. 408).

The most important comparative data on the anatomy of Negroes, mulattoes, and whites have been contributed by Herskovits, Todd, Davenport and Love, and Davenport and Steggerda.[3] The principal contrasts in gross anatomical structure between the Negro and white races are summarized for young adult males by Davenport and Love (p. 40) as follows:

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[3] Todd's measurements were taken on cadavers at the Hamann Museum, Western Reserve University, Cleveland. His collection is comparable to the usual city morgue material, variable but coming for the most part from the lowest social strata. The whites in this collection are reported to have been mostly immigrants from Europe. The Negroes are reported to have been mostly recent migrants from the far South, apparently comparatively free from white admixture (as the measurements indicate). Socially they stand near the bottom of the ladder of the American Negro population, as Herskovits' Howard University sample stands at the top. Todd, 1929, has compared his results with those obtained by Herskovits. This affords an interesting set of data for comparative purposes. In many traits, however, differences between results on dead and living bodies and differences in technique may influence the results, and comparisons of anthropometric measurements reported by different investigators must be made with great caution. Davenport and Love, 1921, in *Army Anthropology*, give the results of a series of anthropometric measurements made on 6,400 Negro troops at demobilization—these veterans are assumed to be representative of the general Negro population of the United States. Davenport and Steggerda, 1929, report intensive studies of "Black," "Brown," and "White" residents in Jamaica.

> "Despite approximately the same height, Negro troops weighed nearly 5 pounds more than white troops. The index of build of the Negro troops was about 32.7 as compared with 31.6 for white troops. The general comparative picture we get of the white troops (including a great variety of races) and the Negro troops is this: The Negro troops have relatively longer legs and arms, shorter trunk, narrower pelvis, more nearly circular ellipse of cross-section of the chest; larger, shorter neck; more nearly parallel outlines of the trunk, larger leg girth, and a greater weight than the whites. The waist is less marked because of the relatively small transverse diameter of the pelvis and chest and the greater circumference of the waist. The Negro seems more powerfully developed from the pelvis down and the white more powerfully developed in the chest. In summary, then, the main differences of shape between Negro and white troops are that the former have relatively longer appendages, shorter trunk, head, and neck, broader shoulders, narrower pelvis, and greater girth of neck, length of thigh and calf, than the latter."

Herskovits has been interested in proving that the variability of Negroes in this country on most anatomical traits is not higher than that of white Old Americans, American Indians, or most Negro races in Africa, as evidence that a new homogeneous racial type is being established: the American Negro. But in many distinctively racial characteristics mulattoes are obviously intermediate between Negroes and whites. And Davenport and Steggerda, in their Jamaica study, found that for many of these traits the "Browns" were somewhat more variable than either the "Blacks" or the "Whites." The problems raised by this discussion are complicated, and are still unsettled (*see* Wagner, "The Variability of Hybrid Population").

The Indians of North America have been shown, in data summarized by Steggerda, to be surprisingly variable in gross anatomical traits, such as stature and cephalic index:

> "American Indian males range in stature from 155 centimeters in the case of the Maya from Yucatan to 175 centimeters for the Sioux of the United States. The means for these two extremes were based upon the measurements of approximately 600 Maya individuals, and upon 400 adult Sioux. These numbers are adequate and present a real average for the people considered.
>
> "This range in stature compares closely with that described by Bean (1931, p. 362) for European whites. He says, 'The extremes are one group of "indigent French" with a stature of 156.0 centimeters, and a group of Scotch farmers, with a stature of 181.2 centimeters.' These statures expressed in inches are 5 feet 1 inch to 5 feet 9 inches for Indians, as compared with 5 feet 1 inch to 5 feet 11 inches for whites, indicating perhaps that the range in stature for Indians and whites are statistically the same" (1932, p. 1).
>
> "This tremendous range in averages [from .76 to .89, ratios of head-length to head-breadth for various groups of Indians] suggests that the native American stock is far from homogeneous. Rather it is composed of many relatively pure genetic strains, possibly produced by mutations from a common original stock" (1932a, p. 35).

Most blood-agglutination studies of American Indians have yielded remarkably uniform results; but radically different findings from those usually gotten have been reported by Matson and Schrader for the Blackfoot and Blood tribes.

Anatomical data, such as the data described above, show the high variability of the very American groups which are commonly regarded as racially most homogeneous: Old Americans, American Negroes, and American Indians. It is difficult to set absolute criteria of race. It is possible, however, to define racial groups statistically, as groups characterized by high frequencies of particular traits, in different degrees, although any of the particular traits which distinguish any race may be absent in some of its members, or may appear in members of other races. Theoretically, this differentiation would seem sufficient to supply an adequate physical basis for large differences between racial groups in average vitality, adaptability to particular conditions, or capacity for intellectual development. On the other hand, the existence of racial differentiations in gross physical characteristics does not necessarily carry any implication of hereditary differences in traits of practical importance or survival value. Hooton, 1926a, has pointed out that racial differentiation is most likely to be established in traits that have no survival value:

> "If race implies the common possession of certain variations as a result of the same ancestry, significant racial criteria should be based principally upon non-adaptive bodily characters. No bodily characters are absolutely unmodifiable, but certain organs are more or less stabilized in their functions, and the less important these functions are, the greater is the probability of hereditary variations manifesting themselves unimpeded and unmodified in such organs. Heredity runs riot in indifferent variations and atrophied organs. The very insignificance of certain features, such as the form of the hair or the thickness of the lips, insures their hereditary transmission in the absence of selected adaptive modifications that have survival value. The human foot, on the contrary, is rigorously adapted and modified for support and locomotion in all varieties of man, and the practically identical requirements of a functional nature tend to obscure and obliterate any racial variations which may have existed or to subordinate them to such variations as may be consequent upon the habits of going barefoot or shod" (p. 77).

Measurements of vital organs have so far yielded much less evidence of great divergence between racial groups than measurements of anatomical traits (*see* Bean, 1926).

An excellent survey of variations in health among racial, regional, and social groups in the United States, with especial attention to the respective rôles of hereditary and environmental factors in causing such variations, is presented by Sydenstricker, 1933, in the chapter on "The Vitality of the American People" in *Recent Social Trends in the United States*, and in an accompanying monograph, *Health and Environment*. The recency, scope, and availability of this presentation make any further general survey of this subject unnecessary at the present time. Sydenstricker's conclusions clearly support, on the most important items, the opinions already formed by the present writers on the basis of their own preliminary investigations, summarized in the opening paragraphs of this chapter. We shall, therefore, simply refer the reader to Sydenstricker's work on this important topic, without any attempt to cover the same ground. We are, however, adding a fairly extensive, selected list of references, with the idea that specialists in particular fields may find such a list suggestive of other lines of research which relate to the general problem of the nature and causes of variations in physical development and health among American groups.

Sydenstricker's conclusions with regard to variations in vitality among racial stocks in this country are as follows:

> "The available evidence thus points strongly to the conclusion that environmental conditions account in far greater degree than any constitutional factors for differences in actual achievement in survival among the racial stocks that have composed the immigration to this country. There may be, and probably are, constitutional differences that manifest themselves in a higher susceptibility to disease on the part of one race stock as compared with another, but the evidence on this point is so unconvincing as yet that it must be regarded as of relatively little importance in comparison with the known effects of different conditions of life and work. At any rate, whatever slight differences in constitution may exist among the races that have come into the American melting pot, there is every sign that fusion will be accelerated more than ever before if any real limitation upon immigration continues. As DePorte has shown, intermarriage between persons of different nativities is increasing for several reasons, the simplest and most potent of which is that there are coming to be fewer and fewer persons of any one nativity to mate. . . .
>
> "Various studies of the Negro indicate that he differs from the white in certain constitutional respects and in susceptibility to certain diseases, but the data are insufficient to warrant definite conclusions as to whether or not the net results of these differences point to inferiority or superiority in vitality, in its strict biological sense" (1933, pp. 644–645).

There are, of course, large variations in the incidence of different diseases in different parts of the country. A sample of such variations is exhibited in the accompanying table. Special attention has been given in this table to isolated agricultural areas in the Eastern United States, characterized as regards productivity as "marginal areas," because variations in health that are related to hereditary factors might be expected to appear in such areas, if anywhere. The results are perhaps suggestive, but certainly not conclusive. In dealing with local variations, as in dealing with variations among races, it is much easier to take account of actual situations than to provide any adequate causal interpretation. No startling differences are apparent in the incidence of mental diseases (neuroses and psychoses) among large regional, or among large racial groups. In any case, such statistics are necessarily affected by local differences in institutional facilities and by variations in diagnostic procedure even within the army series. Very little is known at present about the relative frequency in different strains of the hereditary factors which may condition the development of the major functional psychoses, such as dementia praecox. Regional and racial variations in the incidence of epilepsy are somewhat more striking; but again the causal interpretation is baffling. The problem of mental deficiency will be treated, in relation to other variations in cultural-intellectual development, in the following chapters.

Interestingly enough, in spite of the wide variations in health among various American groups, the chances of survival from birth to maturity appear to be very similar in this country for farm children and for nonfarm children (*see* Chapter II, above). During the ages of most strenuous activity, however, death rates are lower for farm dwellers than for city dwellers, especially in the case of males.

More than ten years have been added to the average expectation of life of every child born alive in the United States by the progress of health activities in this country since 1900—the average expectation of life at birth for white males having risen from 48.23 years in 1901 to 59.09 years in 1930, and that for white females having risen from 51.08 years in 1901 to 62.62 years in 1930, with corresponding proportional increases for the Negro population (Dublin and Lotka, 1934, p. 17). In view of such progress it is apparent that health and longevity are highly sensitive to scientific advance and social organization. In general, it would appear that the environmental conditions affecting physical development are more subject to mandatory public control than are the cultural factors which influence personality and intelligence. Therefore, from the standpoint of environmental conditions, group differences in reproductive tendencies are not of such great importance for the health of the nation as they may be for the general level of cultural-intellectual development. We have already expressed the opinion that no significant differences in *vitality* (survival as affected by hereditary factors) can be established on the basis of evidence now available concerning large population groups in the United States.

The mere suspicion that heredity may be a major factor in causing the most serious nervous and mental diseases, combined with the obvious inability of persons afflicted with these diseases to provide a proper environment for child nurture, is sufficient warrant for public action directed toward preventing such persons from reproducing. But the problems of selection as regards diseases which do not involve a disorganization of personality, or as regards the normal relatives of mentally diseased persons, are almost infinitely complex. These problems, although very important, lie outside the main interest of the present inquiry, which is concerned with group differentials.

Physical vigor does not carry any guarantee of social and intellectual advance. But, granted a high level of intellectual development in any people, improvement in health may be expected through improvements in

TABLE 35

Selected Defects in Drafted Men, Ratio per 1,000 Men *

Sections	Malnutrition and Defective Physical Development	Mutism, Deaf-Mutism	Eye Defects	Blindness in One or Both Eyes	Epilepsy	Mental Diseases	Mental Deficiency	Organic Heart Diseases	Tuberculosis, Pulmonary and Suspected	Venereal Diseases
United States, total	33.22	.99	48.02	7.81	5.16	3.67	14.45	38.73	26.42	32.46
Rural (total, except urban)	29.94	.93	42.15	8.06	5.36	3.56	17.59	38.28	24.64	32.93
Urban (selected cities, 25,000–50,000, all cities over 50,000 population)	39.10	1.13	58.74	7.38	4.79	3.87	8.77	47.54	29.64	31.62
Selected sections, Negro (Negroes 45 per cent or more of total pop.; av. 60 per cent)	35.07	.75	32.68	9.41	5.13	3.13	20.07	34.53	25.25	85.49
Selected sections, Eastern marginal areas										
a. Southern Applachian region (white of native parentage, 90 per cent)	44.15	1.27	40.39	10.34	6.28	2.80	27.19	29.51	29.13	30.92
b. Vermont (white of native parentage, 64 per cent)	68.55	.83	72.60	9.38	12.71	8.32	37.42	57.80	29.93	9.26
c. Northern New Hampshire (white of native parentage, 61 per cent)	35.19	—	59.30	7.04	6.53	.50	13.57	41.21	27.13	14.57
d. Adirondacks, New York (white of native parentage, 62 per cent)	32.07	1.05	41.65	5.38	5.52	2.35	19.06	44.17	47.05	17.08
e. Maine coast (white of native parentage, 86 per cent)	58.90	.75	59.26	5.59	6.71	2.61	36.53	47.70	35.40	16.40
f. North Carolina, Cape Hatteras (white of native parentage, 70 per cent, Negroes, 30 per cent)	33.37	3.43	48.59	14.54	14.54	5.14	23.10	38.49	17.96	23.95

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* Compiled from Love and Davenport, 1920, *Defects Found in Drafted Men*, pp. 210–217, 319–348, 1236–1243, 1394–1463.

scientific techniques and social organization. An intelligent body politic is the first requisite of all social progress. Therefore, for the rest of this book, we shall give our whole attention to the study of variations among groups in cultural-intellectual development in relation to their reproductive tendencies, and to the analysis of the forces now at work in the American population which may affect in a large way the social or genetic conditions of cultural-intellectual development in this nation.

CHAPTER VI

THE CULTURAL–INTELLECTUAL BACKGROUND OF AMERICAN STOCKS

A high general level of intelligence is almost universally held to be desirable in any people aspiring to self-government and to freer and larger life. Because of the very great importance and the wide appeal of this theme, it has frequently been treated dogmatically and impressionistically. Although it is easy, by an uncritical use of statistical materials, to support opinions that are really based on emotional bias, an extensive and more critical use of results obtained through the application of standardized techniques offers our only hope for an objective account of group variations in intelligence. Accordingly, in the following chapters we shall make extensive use of the results of modern psychological tests.

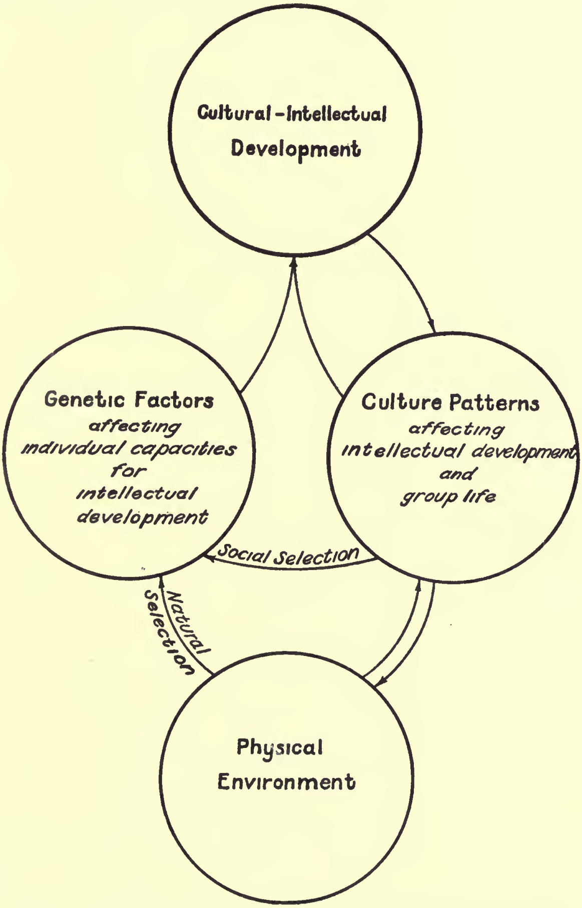

Fig. 32. Diagram Showing Relation of Cultural-Intellectual Development to Genetic Factors, Culture Patterns, and Physical Environment.

It is important to recognize at the start that "intelligence," as measured by mental tests, is something far more fundamental than mere accumulation of information, but nevertheless something that is, in part, the product of environmental forces and that can only be measured through the medium of responses that have been, in part, socially conditioned. Intelligence is ability to deal systematically with symbolic materials, such as words and numbers, or to organize concrete materials in space and time so as to carry out definite aims or directions; it is, in short, the ability to learn and to reason. Yet such an ability at any time in the life of an individual is a developed ability. It is determined in part by hereditary physical factors and in part by the habits of life of the family and the community in which the individual has been brought up. For this reason we shall constantly refer to the trait that we are considering as "cultural-intellectual development." Many may consider this term unnecessarily awkward. Most psychologists will probably feel that we overdo this constant iteration of the rôle of cultural patterns in influencing intelligence test performance. Nevertheless, in view of the widespread popular misinterpretation of "I.Q.'s" as immediate indices of innate abilities, we feel that this constant reference to the cultural aspect of intellectual development is warranted.

Where other indices of cultural-intellectual development are used, as in studying regional variations in the following chapter, we shall find that there is a high positive correlation between intelligence test ratings and these other indices of cultural-intellectual level, such as reading habits, frequency of persons attaining national recognition, or accuracy of census data. This is as we should expect, since the ability to handle words and numbers so as to solve problems quickly and accurately is both a critical index of the cultural level of any community at any time and a determining factor in the adjustment of the community to new cultural patterns. The results of intelligence tests have been found most valuable in predicting school progress and in the adjustment of levels of difficulty in school-room tasks to the needs of individual children.[1] Such tests have also been shown to be of considerable, although limited, value in the selection of persons for clerical and administrative and other gainful positions. Here, however, other personality traits are frequently quite as important as intelligence. Moreover, our tests of intelligence are probably less adequate at the higher levels of intellectual ability, because of the difficulty of properly standardizing tests at these levels. Furthermore, it may be that special types of ability play a very large rôle in the kind of mind that the world recognizes as genius.

This leads us to a difficulty in using mental tests which we can only refer to very briefly, namely, the ambiguity of the conception of "general intelligence." This conception has played a large rôle in the development of mental tests, but it is proving of very doubtful significance in the more advanced analysis of intellectual processes. So much so that some psychologists favor abandoning altogether the conception of "general intelligence." This change may have important implications for the analysis of genetic factors in intelligence, indicating the multiplicity of factors affecting intellectual development (*see* Chapter X). However, until we come to deal with the causes of variations in cultural-intellectual development, we shall continue to use this idea of general intelligence, in view of its well-established practical significance.

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[1] For a general survey of intelligence tests and their uses see, Pintner, *Intelligence Testing, Methods and Results.*

In this section, then, we shall deal with variations in cultural-intellectual development in an objective but relatively superficial fashion. We shall, however, attempt to eliminate gross disturbances in group comparisons, such as the influence of foreign language handicaps, so that the results of any comparisons made may be truly significant of important differences in developed abilities. Where results are especially apt to be misleading, we shall sometimes call attention to complicating circumstances. We shall not, however, attempt to separate the influence of cultural environment from that of hereditary capacity in this part of our study (Part II).

Since about 90 per cent of the American people are derived from European sources, we shall begin our survey of the intellectual development of American groups by reviewing the results of two series of psychological tests administered to sample populations in Europe. One investigator, Klineberg, has reported a study of ten groups in Germany, France, and Italy—limiting his samples to children of the same sex (boys) and of similar ages (10 to 12 years). The samples (100 boys in each) were selected to show contrasts between rural and urban groups, and to be representative of Alpine, Mediterranean, and Nordic stocks. The racial groups were chosen from rural areas populated by relatively pure racial types. The rural samples, in addition to selection by location, were checked as regards anthropometric traits, so as to eliminate all except typical representatives of each of the three racial types to be investigated. The urban samples were selected at random from the public school populations of Hamburg, Paris, and Rome.[2]

The racial analysis on which this selection is based is stated by the author as follows:

> "It was decided that a relative 'purity' of racial sampling might be attained by choosing the subjects according to three distinct criteria used in combination. In the first place the study was pursued in those geographical areas in which, according to the maps of the distribution of various traits, the physical characteristics of the 'race' being studied were to be found in greatest profusion; secondly only those subjects were chosen for study who themselves had been born in the particular area under investigation, and both of whose parents, as far as could be ascertained, had also been born in that area; and finally, only those subjects were chosen for study who possessed the physical characteristics accepted as typical for that particular 'race' " (p. 14).

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[2] "Three city groups were studied, in Paris, Hamburg and Rome. In each case one hundred boys were tested, and the attempt was, of course, made to have the selection as random as possible. Four different schools in each city were visited, and in each case the principal of the school was asked to coöperate in making the sample a representative one by sending the boys to be tested in alphabetical order until twenty-five subjects had been tested. Note was kept of the physical characteristics and the cephalic index of every subject, but the only criterion which the subject had to satisfy was that he be born in the city in which the study was being made at the time" (p. 21).

TABLE 36

PINTNER-PATTERSON POINT SCALE SCORES FOR EUROPEAN BOYS AGED 10–12 YEARS SELECTED BY RACIAL TYPE AND BY LOCALITY *

Rank	Ethnic Type	City or Province	Mean	Median	S.D.
1	Mixed	Paris	219.0	218.9	46.2
2	Mixed	Hamburg	216.4	218.3	45.6
3	Mixed	Rome	211.8	213.6	42.6
4	German Nordic	Hanover	198.2	197.6	49.0
5	French Mediterranean	Eastern Pyrenees	197.4	204.4	45.6
6	German Alpine	Baden	193.6	199.0	48.0
7	Italian Alpine	Piedmont	188.8	186.3	48.4
8	French Alpine	Auvergne and Velay Massif Central	180.2	185.3	46.6
9	French Nordic	Flanders	178.8	183.3	56.4
10	Italian Mediterranean	Sicily	173.0	172.7	54.2

* Adapted from Klineberg, 1931, *A Study of Psychological Differences between "Racial" and National Groups in Europe*, pp. 17–19, 27.

These data, interpreted in relation to the accompanying text and other relevant psychological studies, lend support to several important inferences:

1. There is a significant difference in intelligence test performance between the urban and rural groups compared in this study. Such differences are almost universally found, and their presence here confirms the belief that urban environment, as such, is favorable to the development of the sort of abilities that are measured by most intelligence tests. We must, therefore, keep constantly in mind the occupational or regional derivation of immigrant groups, as well as their ethnic derivation.

2. There are significant differences in intellectual development between different local groups and between different nations represented in this sample. There are 87 chances out of 100 that a true difference between Hamburg and Rome is indicated; and the average of the German rural groups combined (195.9) is significantly higher than the average of the

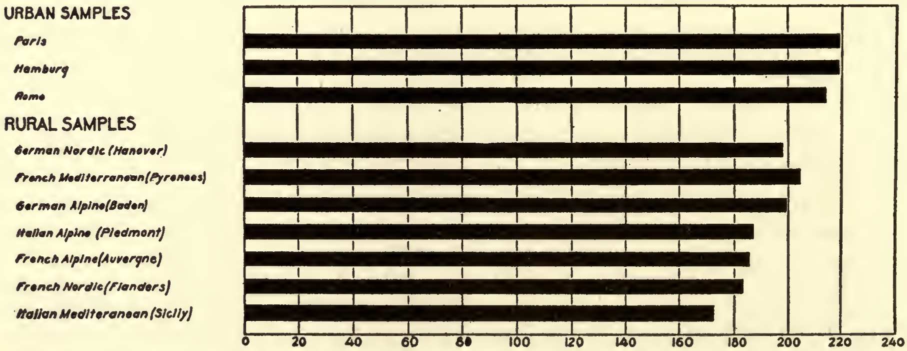

FIG. 33. COMPARISON OF AVERAGE SCORES OF SELECTED URBAN AND RURAL SAMPLES OF BOYS (10 TO 12 YEARS OF AGE) ON THE PINTNER-PATERSON POINT SCALE. Data from Otto Klineberg, 1931, *A Study of Psychological Differences between Racial and National Groups in Europe*, Archives of Psychology, No. 132, pp. 17–19, 27.

Italian rural groups combined (180.9). If comparison is made between the combined German rural sample and the sample from Southern Italy, whence come the majority of the Italian immigrants to the United States, the difference is still greater. Variations between local groups, regardless of national boundaries, are even more clearly indicated. The striking differences between Piedmont and Sicily, in Italy, and between the French Mediterranean and the French Nordic (Flemish) groups may be cited. Klineberg comments on the latter result, as follows:

> "The poor results obtained by the French Nordic (Flemish) group in this study are in harmony with results reported by Decroly. He gave the Ballard test to over 7,000 Belgian school children and found the Walloon children to be superior to the Flemish group at almost all ages. It may be noted that the Walloon portion of the Belgian population is predominantly Alpine, and the Flemish portion, which is contiguous to the part of French Flanders visited in this study, predominantly Nordic" (p. 30).
>
> "French Flanders is by no means a poor country. The fertility of the Flemish plain and the thrift and energy of the people make this section one of the best-cultivated and economically one of the best-developed of all the country districts visited in the course of this study. The Flemish group stood very low, however, in the test results.
>
> "It must be borne in mind that 'cultural background' is not confined to economic and industrial factors, and there is one interesting aspect of life in Flanders which may have had some bearing upon the results. There is fairly widespread in Flanders a certain feeling of hostility and resentment against the school system, due to the tenacity with which the people cling to the Flemish tongue, the use of which is forbidden in the schools. . . . This makes the opposition between teacher and child, or between school and child, all the more marked. Probably nowhere else in France, with the one exception of Alsace, is the language problem in the schools more acute. The teachers expend much ingenuity in keeping the pupils from speaking Flemish (to which language they revert as soon as school is dismissed) and resort to every type of opposition and punishment which they think may be effective" (pp. 39–40).

3. The differences in intellectual development observed in European populations do not fit consistently into any general hierarchy of race types. Nordics in some localities are inferior to Mediterraneans in some other localities—and vice versa. It may be added that in the United States some groups with peculiarly low intelligence scores are almost wholly of Anglo-Saxon origin and may be predominantly Nordic in physical type.

4. The study leaves unsolved the question of the nature of the differences in intellectual development observed in various European groups.

We may come somewhat closer to the American scene by examining data on the psychological level of applicants for immigration visas to the United States, collected at various consular offices in Europe, by the United States Public Health Service.[3] In this series the groups include both sexes and persons of different ages. All applicants for immigration visas at certain consular offices were tested during limited periods, subject to these conditions: (1) All totally illiterate persons (unable to read or unable to write their names) were excluded; (2) All graduates of universities, normal schools, and gymnasia were eliminated, thus excluding from the tests about 12 per cent of the Scandinavians, Germans, and English, about 4 per cent of the Irish, and about 2 per cent of the Italians otherwise available; (3) the series was limited to persons aged 15–44 years. The tests were administered by the investigator, Lawrence Kolb, or under his immediate supervision.

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[3] A preliminary account of the results of this investigation was presented at the meeting of the American Association for the Study of the Feebleminded in 1932. Other data were presented in tables and charts at the Third International Congress of Eugenics, 1932. The materials described here are derived chiefly from this exhibit.

The major tests used were as follows:

The Ferguson Form Board Test.
The Porteus Maze Test (adult mazes not used).
The Pintner Non-Language Test.
The Kohs Block Design Test—used only in Italy, Ireland, and Germany.

The following test items were also employed:

Healy Construction Test A.
Healy Construction Test B.
Gwyn Triangle Test.
Cube Imitation Test, Pintner Modification.
Mare and Foal Test—used only in Italy, Ireland, and Norway.
Repeating digits forward.
Repeating digits backward.
Copying Binet designs (Stanford series, year 10).
Arranging weights (Stanford series, year 9).
Ball and Field Tests (Stanford series, years 8 and 12).
Identifying Geometric Figures (Mullans Learning Test).

The Pintner Non-Language Test requires paper and pencil performance, although it does not require language response. It is therefore subject in some measure to effects of schooling. The Ferguson form boards are perhaps as free from the influence of schooling as any intelligence test can be; but it has been shown to give rather low correlation ($r = .33 \pm .06$) with National Intelligence Test scores, in the case of 75 American school children (*see* MacPhee and Brown). The Healy Construction Tests are items in the Pintner Paterson Performance Test series. Scores measure the time taken to complete the construction. The Porteus Maze, on the other hand, is perhaps as much a test of methodical temperament as it is a test of intelligence. However, the general consistency of the results obtained with these different tests is quite striking. Environmental handicaps show up most strongly in the case of the women in these groups, probably due to the lack of cultural stimulus in the lives of many European women.

The South Italians applying for immigration visas to the United States have, on the average, less schooling than any of the other groups (5.3 years for Italian males, 4.3 years for Italian females, in contrast to 6.4 and 6.6

TABLE 37

Environment and Training of Applicants for Immigration Visas to the United States from Six Different Regions, Literate Persons, Aged 15–44 Years *

	Norway	Sweden	Great Britain		Germany		Irish Free State	South Italy
			England	*Wales*	*Cologne*	*Stuttgart*		
Number of cases								
Males	183	124	30	13	140	155	328	131
Females	232	128	55	20	163	194	402	124
Median age								
Males	21	21	26	26	23	23	23	26
Females	23	22	27	24	24	25	20	26
Average years of schooling								
Males	7.4	6.4	9.3	9.3	7.8	7.4	7.5	5.3
Females	7.2	6.6	9.3	9.3	8.0	7.3	8.7	4.3
Average grade reached								
Males	7.2	6.4	7.0	5.9	7.7	7.3	3.9	3.5
Females	7.2	6.5	6.7	6.4	7.7	7.3	4.3	3.2
Average number of rooms per family								
Males	4.9	3.4	6.7	5.8	4.7	4.7	2.8	3.3
Females	4.6	3.3	5.8	6.1	4.5	4.5	3.1	3.8
Average size of family								
Males	8.5	8.8	7.0	7.3	7.9	8.2	9.3	7.4
Females	8.9	8.8	8.0	8.7	8.1	8.3	9.9	10.2
Percentage residing in cities								
Males	28.4	3.2	50.0	21.4	60.3	46.5	10.3	8.4
Females	37.9	8.6	46.9	11.1	66.2	41.8	10.2	15.4
Percentage of skilled workers								
Males	26.8	17.7	43.3	15.4	49.7	56.8	15.2	44.3

* Exhibit by Kolb, 1932, at the Third International Congress of Eugenics.

years for Swedes and 7.4 and 7.2 years for Norwegians). The Swedes, Irish, and Italians in this series were drawn chiefly from rural areas, but about a fourth of the Norwegians and about a half of the English and Germans came from cities. The Irish represented in this sample apparently had been living in the smallest houses and, with the possible exception of the South Italians, represented the largest families.

The median "test ages" (i.e., mental ages as indicated by these tests) of the rural and urban residents from each region on three tests are shown in Figure 34 (*see also* Figure 35, and Appendix L).

At first sight these results seem to differ a good deal from Klineberg's results. However, both sets of data may be accepted as valid indices of the present intellectual development of the populations sampled. The apparent discrepancies may be interpreted as follows:

1. Klineberg's data apply to the total populations in different areas, whereas there may be some selectivity in immigration to the United States. In so far as any such differences exist, Klineberg's data would be more significant for description of European populations, but Kolb's data would be more significant for description of American groups, in so far as recent immigrants from each country resemble immigrants of the same nationality in previous periods.

2. Klineberg's data are obtained from children aged 10–12 years, whereas adults aged 15–44 years are represented in Kolb's data. The effects of stimulating and depressing environments are probably exaggerated in comparing adult groups.

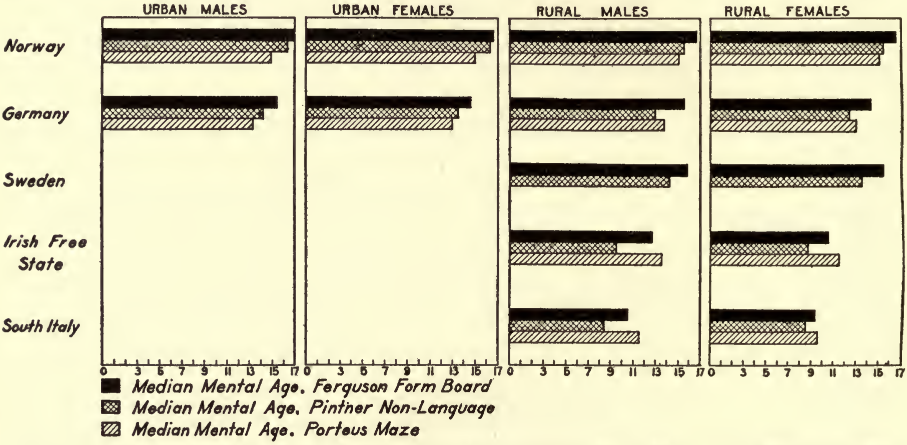

FIG. 34. MEDIAN MENTAL AGES OF RURAL AND URBAN RESIDENTS, MALE AND FEMALE, AMONG IMMIGRANTS FROM FIVE EUROPEAN SOURCES. Scores made on Ferguson Form Board, Pintner Non-Language, and Porteus Maze mental tests. Data from Kolb, 1932.

3. The difference between North Italian and South Italian groups does not appear in the tables shown above. Only small numbers of North Italians were tested by Kolb, because comparatively few immigrants to the United States are drawn from the Northern portion of Italy. The performance of 39 women tested by Kolb at Trieste was far above that of the women tested at Naples. This result agrees with the marked contrast in test performance between the "Italian Mediterranean" and the "Italian Alpine" groups studied by Klineberg.

4. The French Nordic group from Flanders, which pulled down the average score for Nordics in Klineberg's series very greatly, is not represented in Kolb's data. It does not, of course, represent a large element in the immigrant population of the United States.

5. The English, Irish, Norwegian, and Swedish populations studied by Kolb are not represented in Klineberg's series.

If Klineberg's German Nordic and German Alpine samples are associated with Kolb's samples from Sweden, Norway, Cologne, and Stuttgart, and if Klineberg's Italian Mediterranean group is associated with Kolb's South Italian group, the two studies may be said to agree in indicating a higher initial intellectual development among immigrants from Germany and the Scandinavian countries than among immigrants from Southern Italy.

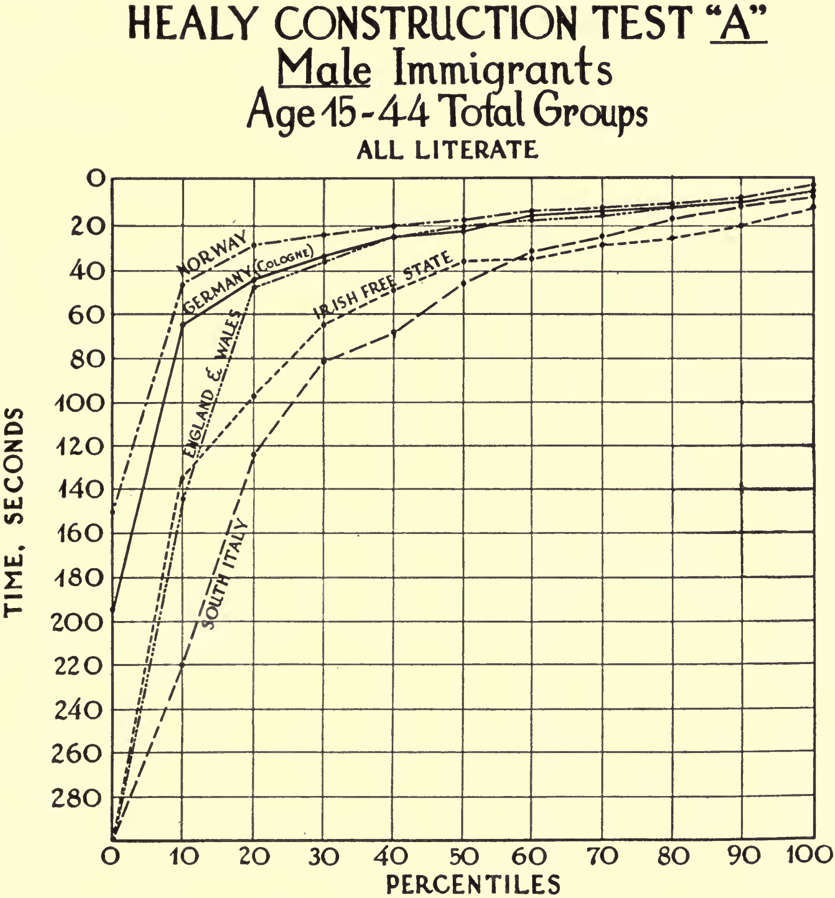

FIG. 35. DISTRIBUTION OF SCORES ON HEALY CONSTRUCTION TEST A BY LITERATE MALE IMMIGRANTS TO THE UNITED STATES EXAMINED AT EUROPEAN CONSULAR OFFICES. From Kolb, 1932. The scores represent time required to complete the test. Thus some persons in each group were able to complete the test in less than 20 seconds. Twenty per cent of the Norwegians required 30 seconds or more; the same per cent of the Germans and English required more than 40 seconds; the same per cent of the Irish required more than a minute and a half; and the same per cent of the Italians required at least two minutes.

Similar differences, as might be expected, are found among first generation immigrants in the United States. Such differences are indicated by the intelligence tests given to drafted recruits in the United States army, 1917–1918, although foreign language and associated handicaps confuse these results. The conspicuous rise in apparent mental age even on the Beta Examination (supposedly free from language factors) with length of residence in the United States is a clear indication of the force of such handicaps (*see* Yerkes, pp. 701–704). The distribution of army intelligence scores for different immigrant groups is shown in Table 38, arranged so as to facilitiate comparisons among English-speaking and among non-English-speaking nationality groups. Within the non-English-speaking group the conspicuous divergence of the small sample from Holland may be due in part to chance. Some of the differences in both series may be considerably influenced by rurality of home environment and similar cultural factors.

TABLE 38

Percentage Distribution by Letter Grades of Foreign-Born Recruits, United States Army Intelligence Tests (Alpha, Beta, or Individual Examinations) *

A. MEN FROM ENGLISH-SPEAKING COUNTRIES

Country of Birth	Number of Cases	A, B	C+, C, C−	D, D−, E
Canada	972	10.5	69.6	19.5
England	411	19.7	71.8	8.7
Ireland	658	4.1	56.0	39.4
Scotland	146	13.0	73.4	13.6

B. MEN FROM NON-ENGLISH-SPEAKING COUNTRIES

Country of Birth	Number of Cases	A, B	C+, C, C−	D, D−, E
Austria	301	3.4	59.0	37.5
Belgium	129	.8	74.8	24.0
Denmark	325	5.4	81.6	13.4
Germany	299	8.3	77.2	15.0
Greece	572	2.1	54.5	43.6
Holland	140	10.7	80.1	9.2
Italy	4,007	.8	35.8	63.4
Norway	611	4.1	70.8	25.6
Poland	382	.5	29.9	69.9
Russia	2,340	2.7	37.4	60.4
Sweden	691	4.3	76.4	19.4
Turkey	423	3.4	54.8	42.0

* Adapted from Yerkes, Editor, 1921, "Psychological Examining in the U. S. Army," *Memoirs of the National Academy of Sciences*, Vol. 15, pp. 696, 698.

The relative variability in intellectual development of various foreign stocks is indicated, for several major groups, by the standard deviations in test score grades (combined scale). The Scandinavian group is relatively uniform at a high level. Immigrants from Italy and from Greece also show rather low variability but at a lower level. On the other hand, new residents from Great Britain are considerably more varied, and an even greater variability in intellectual development is found among immigrants from Russia. The standard deviations for these groups on the combined scale are shown in Table 39.

TABLE 39

VARIABILITY OF SELECTED NATIONALITY GROUPS IN U. S. ARMY INTELLIGENCE PERFORMANCE *

Country of Birth	S.D.
Canada	2.71
England, Ireland, Scotland	2.83
Denmark, Norway, Sweden	2.41
Germany, Austria	2.69
Greece	2.57
Russia	2.96
Italy	2.60

* *Op. cit.*, p. 699.

The intellectual background of many Mexican immigrants to the United States is such as to suggest a distinctly unfavorable prognosis for their adaptation to social situations in the United States. Manuel Gamio, a Mexican scholar, working under the auspices of the Social Science Research Council, has studied the provincial sources of Mexican immigration to the United States, with an analysis of postal money orders from this country to Mexico during July and August, 1926. He found that the three provinces of Jalisco, Guanajuato, and Michoacan received 58 per cent of the orders sent from Arizona, California, and New Mexico and 77 per cent of the orders sent from Illinois, Indiana, and Michigan. These states are neither the most populous nor nearest to the border, being located in the southwest section of the central plateau. He describes the situation of the groups from which Mexican immigrants are largely recruited as follows:

> "Of the three states in the Republic which have more than a million inhabitants Jalisco is the only one which provides a high proportion of emigrants . . . conditions there for agriculture are difficult, the land having always been in the hands of a small number of big proprietors. For this reason the excess population of the prolific *peôn* class has been obliged to emigrate periodically. This region, because of its fertility and great production of cereals, and its excess population, has rightly been called the granary and '*peôn* purveyor' of Mexico. The same circumstance, in smaller degree, can be said of Aguascalientes, Durango, Zacatecas, and San Luis Potosí."
>
> ". . . the average daily wage for agricultural workers in Mexico is 0.91 *pesos*, and that of an industrial worker 1.40 *pesos*, an average of 1.15 *pesos*, or $0.57 a day in American money. But in the regions from which the greatest part of the Mexican immigrants come the average daily wage is still lower."
>
> The immigrant population is predominantly Indian and *mestizo*. Between Indians, *mestizos* and whites there is no real race repulsion or prejudice. That which exists is economic and cultural, since the whites generally belong to higher strata in these two respects and the Indians to the lowest. This Indo-Spanish cross which has been going on since the conquest is not, however, the only example of intermarriage with the Indian, for the Indo-Germanic mixture has reached fair proportions in Mexico, in Guatemala, and in other Latin-American countries.

> Descendants of older Mexican immigrants, even of the third generation, have tended to preserve native traditions more than descendants of European immigrants. "Notwithstanding that they are American citizens, they remain on economic, political, and social levels always inferior to those occupied by Americans of like condition and capacity." (Gamio, pp. 21–23, 35, 52–54. Reprinted by permission of University of Chicago Press).

Relying on the results of this investigation by a Mexican scholar, working under the auspices of a scientific committee in the United States, it appears that the recent Mexican immigration to the United States has been drawn from groups which are and have been for a long time extremely handicapped culturally and economically—in fact, from the most backward groups in Mexico. It also appears that their presence in the United States leads to serious economic and social conflicts. There is no conclusive evidence about the innate characteristics of these people.

The Chinese and Japanese represent ancient civilizations justly renowned for their high cultural attainments but characterized by a very uneven spread of privileges and achievements. Most of the Chinese and Japanese in the United States, in Hawaii, or in Asiatic cities in touch with Western civilization, make a very good showing on formal intelligence tests where language handicaps are eliminated. Orientals in rural districts in the United States or its island territories make lower scores, as might be expected in view of similar findings with other groups (*see* Table 40).

TABLE 40

AVERAGE INTELLIGENCE QUOTIENTS OF CHINESE AND JAPANESE CHILDREN, AS REPORTED IN VARIOUS STUDIES *

Investigator and Test	Subjects	Place	Mean or Median I.Q. (as Reported)
Symonds, Pintner Non-Language Test	513 Chinese	Hawaii	99.3
Sandiford and Kerr, Pintner-Paterson Performance Test	224 Chinese	Vancouver	107.2
Porteus and Babcock, Binet	212 Chinese	Hawaii	87
Kubo, Modified Binet Test	536 Japanese	Tokyo	99
Darsie, Binet	658 Japanese	California	
		Rural	77
		Urban	99.3
Sandiford and Kerr, Pintner-Paterson Performance Test	276 Japanese	Vancouver	99
Porteus and Babcock, Binet	229 Japanese	Hawaii	84.6

* Collated from Garth, 1931, *Race Psychology*, pp. 77–78.

Two American groups, Negroes and Indians, have been recently drawn from primitive cultures. Moreover, the main bodies of both groups have remained more or less cut off from the social and cultural influences that have fostered intellectual advance in the whole nation. It is, therefore, not surprising that these racial groups make a very poor showing on formal tests of intelligence, adapted to people living in urban communities. At the same time, the possibility of racial differences in the distribution of intellectual capacities is always present.

The materials presented above show that various racial stocks in this country differ widely in cultural-intellectual background. We shall find that such differences are not easily sloughed off, but tend to persist for several generations at least in American cities.

CHAPTER VII

VARIATIONS IN CULTURAL-INTELLECTUAL DEVELOPMENT AMONG RACIAL AND REGIONAL GROUPS

Contrasts in present levels of cultural-intellectual development among various groups in American life reflect to a high degree older variations in intellectual background. The persistence of group differences in cultural-intellectual development for many generations, even in a superficially homogeneous environment, is a well established phenomenon.[1] The interpretation of such a tendency, however, presents very complex problems to all—except to those biologists who are convinced that all such persistence is due to genetic factors, or to those sociologists who are equally persuaded that environmental explanations are always adequate.

Critical investigation of the relative rôles of heredity and environment in causing apparent differences in intelligence between various racial groups will be deferred to Part III. Yet even in our preliminary survey of present levels of cultural-intellectual development among American groups, the materials will be arranged so as to enable the reader to keep constantly in mind two types of grouping, the *regional* and the *racial*, each of which must always be considered in relation to the other. We will, then, attempt so far as possible to describe present variations in cultural-intellectual development among different racial stocks in the same areas and among different groups of similar racial background living in different areas. Even this procedure, however, leaves out of account more subtle variations in institutional situation and in family background associated with occupational and other social distinctions.

1. *Cultural-Intellectual Levels of Various Nationality Groups in American Cities*

There have been many studies of the intelligence of immigrant and other ethnic groups in this country. These studies vary greatly in value. Among the better studies of groups in similar environments there is a fair agreement regarding results obtained with standard intelligence tests—but there are great differences of opinion regarding the interpretation of these results. We shall report the results of studies that seem to have special value, either because of their range or because of light thrown on some critical points.[2]

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[1] Studies by Dunlap and others in Hawaii are especially illuminating in this regard.

[2] The reader may turn for further references to the summaries by Garth in *Race Psychology;* by Pintner in *Intelligence Testing, Methods and Results*, Chapters XX and XXI; and by Witty

It will be well at first to review data on the intellectual development of children brought up in the relatively homogeneous environment of Northern cities. After doing so, we shall investigate differences among racial groups living in radically different environments. The most important environmental factors affecting intellectual development of the children of immigrants in Northern cities are (1) foreign language difficulties, (2) variations in cultural patterns in the homes, ranging from patterns carried over from primitive environments to such differences as are commonly found between social classes, and (3) other differences in environment associated with economic status. Variations in other localities will be taken up in a separate section.

As might be expected, the children of immigrants, although born and brought up in this country, frequently show variations that are similar to those found among the parent stocks in Europe. As far as the writers are aware, no studies have been made in which children of the third generation, derived from various ethnic stocks, have been treated separately.

American-born children representing a wide variety of ethnic groups living in four mill towns in Massachusetts were examined by Hirsch in 1924–1925. Hirsch used the Pintner-Cunningham Primary Mental Test (a non-verbal paper and pencil test, with emphasis on speed) for the primary children, and the Dearborn Tests A and C (also group tests) for the older elementary school children. The Dearborn Test A, used with children in Grades II and III, is largely non-verbal. The Dearborn Test C is half verbal and half non-verbal. The study was limited to American-born children, but no information was obtained regarding language used at home. The mean intelligence quotients obtained by Hirsch for Grades I, II–III, and VI–VII are shown in the accompanying table, together with the rank order of the different groups when the scores for all grades and all three tests are averaged together. On the whole, there is a rather remarkable consistency between the scores made by the same groups at different school grades. The tests, however, are all similar in type and probably tap the same sort of abilities. It should be noted that group tests are more subject to the influence of foreign language usage in homes and to other extraneous influences than are individual tests.[3] The results of group tests with children of immigrant parents must, therefore, always be used with caution.

The superiority of the Swedes, Polish Jews, and English to the Americans in this sample is statistically reliable. The Russian Jews, Germans, Lithuanians, and Irish are not significantly different; but the Canadians, Poles, Greeks, French Canadians, Italians, and Portuguese in this series have average scores which appear to be significantly below those of the Americans (Hirsch, 1926, p. 296). Varying proportions in different groups in this series

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and Lehman in "Racial Differences: The Dogma of Superiority," *The Journal of Social Psychology*, Vol. I, pp. 394–418.

[3] On this subject, *see*, for example, the study by Mead, 1927.

TABLE 41

MEAN INTELLIGENCE QUOTIENTS, PINTNER-CUNNINGHAM AND DEARBORN A AND C, FOR PUBLIC SCHOOL CHILDREN, MASSACHUSETTS MILL TOWNS, BY "NATIO-RACIAL" GROUPS *

"Natio-Racial" Groups	Total Numbers, All Grades	Rank Order of Mean Scores, All Grades	Mean I.Q.'s for Groups with 30 or More Children in Each Grade Class		
			Pintner-Cunningham Test (Grade I)	*Dearborn A Test (Grades II–III)*	*Dearborn C Test (Grades VI–VII)*
English-speaking sources					
English	213	3	—[a]	*97.0*[b]	*102.8*[b]
American	1,030	6	97.8	97.3	99.3
Irish	214	8	—[a]	*95.6*[b]	*94.1*[b]
British-Canadian	155	9	—[a]	*91.9*[b]	*96.1*[b]
Foreign-speaking sources					
Polish Jews	75	1	—[a]	—[a]	—[a]
Swedes	232	2	—[a]	*101.7*[b]	*101.9*[b]
Russian Jews	627	4	97.7	97.9	97.5
Germans	190	5	—[a]	*97.5*[b]	99.1
Lithuanians	468	7	*95.5*[b]	95.7	96.4
Russians	90	10	—[a]	*87.0*[b]	—[a]
Poles	227	11	—[a]	*88.7*[b]	90.9
Greeks	270	12	*84.3*[b]	87.4	89.8
Italians	350	13	86.3	87.1	83.3
French-Canadians	243	14	—[a]	*87.3*[b]	87.7
Portuguese	671	15	76.8	84.6	86.7

* Adapted from Hirsch, 1926, *A Study of Natio-Racial Mental Differences*, pp. 287, 312.

[a] Groups containing less than 30 children.

[b] Means for groups with less than 60 printed in italics.

reach or surpass the median I.Q. of the American group, ranging from 12.8 per cent of the Portuguese, 14.6 per cent of the Italians, and 22.2 per cent of the French Canadians to 70.7 per cent of the Polish Jews (p. 304). More than a third of the Portuguese and French Canadians, and nearly a third of the Italians and Greeks in this series show intelligence quotients below 80. The fact that four groups with parents from non-English-speaking countries (Polish Jews, Swedes, Russian Jews, and Germans) out-rank the children born of American parents in this series shows that foreign-language disturbance, as such, does not wholly control these results. It does undoubtedly have some effect and its effects may be more intense in some groups than in others. However, differences related to economic status and incentives and differences in intellectual stimulus received at home and possible genetic differences must be held largely responsible for these variations—except in the case of apparent differences, as between Canadians and Americans, Polish Jews and Russian Jews, English and Germans, which are not substantiated by other studies, and which may therefore be attributed to the unrepresentative character of the samples included in this series. Most of the conspicuous variations among immigrant groups represented in this study, however, do commonly appear, in varying degrees, in other studies.

The French Canadians in the series described above show somewhat greater variability (standard deviation, 14.55) than other groups with low average scores (Italians, S.D. 11.94; Poles, S.D. 12.96; Portuguese, S.D. 13.47), although not so great as that of the "American" population in the same communities, S.D. 15.87 (p. 289). Kirkpatrick records an even more striking variation among French Canadians in another Massachusetts industrial area, as shown by results of tests given to eleven-year-old children (regardless of grade location). The two main groups of French Canadian children tested by Kirkpatrick were located in two parochial schools, (A) in Leominster, and (B) in Fitchburg. Results obtained from a smaller public school sample of French Canadian children resemble those from the poorer parochial school. Three other groups were tested at the same time in the same towns, one group with American ancestry, one with Finnish, and one with Italian. The minimum numbers of children tested were "American," 91; Finnish, 141; Italian, 88; French Canadian, School A, 52; and School B, 74. The Illinois Examination (a group verbal test) and the Army Examination Beta (a non-verbal paper and pencil test) were used. The latter test (somewhat like the tests used by Hirsch with the younger children) is probably a reasonably fair test for school children with foreign-language background. The mean I.Q. for each group on the Beta examination was as follows: "American," 104; Finnish, 100; Italian, 83; French Canadian School A, 100; School B, 74. Among the Finnish children, 23 per cent scored at or above third quartile for the "American" children; among the Italian children, 12 per cent; among the French Canadian children in School A, 13 per cent; in School B, none. Similar results (with somewhat larger differences) are indicated by the scores on the Illinois Examination and by achievement scores in reading and writing. The great difference found in this study between two groups of French Canadians living in nearby communities is especially interesting. The author supplies many interesting details bearing on the interpretation of this difference. It appears that a larger proportion of the parents of the children in School A spoke English at home, and were in other ways acculturated to their present environment. But there are also some indications that different selective factors may have affected the composition of French Canadian families in the two communities here represented. The French Canadians in this series, if these two samples are combined, appear to be intermediate in present intellectual development between the Italians and the Finns.

A study by Bere, 1924, affords a critical analysis of the performance of three groups, Italian, Bohemian, and Jewish, on specific items of the Stanford Revision of the Binet tests and on the Pintner-Paterson Performance Scales. The subjects used in this study were ten-year-old boys who had been in New York City schools for at least two years, 100 in each group.

Selection was made at random from members of each nationality group in schools located in selected neighborhoods. The Italians were selected from neighborhoods in which the predominant native dialects were Genoese, Calabrian, Neapolitan, and Sicilian, from South Italy. The Jews are East European, chiefly Russian Hebrews. Bere includes fairly extensive data on the social status of these groups.

> The average length of residence in the United States for the parents in each group was approximately equal, 19.3 years, 17.6 years, and 19.8 years, respectively for Italians, Hebrews, and Bohemians. Total illiteracy, however, was much more frequent in the Italian group than in either of the other groups; 38 per cent of the Italian mothers, 13 per cent of the Hebrew mothers, but only 4 per cent of the Bohemian mothers were unable to read or write in any language, according to the children's reports. Foreign language predominated in a majority of the homes in each group; and 24 per cent of the Bohemian, 23 per cent of the Italian, and 3 per cent of the Jewish boys reported that English was not used in the home at all. The occupational distribution of fathers was similar as regards the three upper levels of the Taussig scale. The "semi-professional" class contains 21 per cent of the Italian, 18 per cent of the Hebrew, and 17 per cent of the Bohemian fathers. A third of the Italian fathers and a tenth of the Bohemian fathers but only 4 per cent of the Hebrew fathers were classified as "unskilled." The Italians are highest in economic status as measured by average rental value per room; but if size of family is taken into account, it is found that the Bohemians spend most for housing per room per person. The Hebrews spend least on either basis (pp. 25–31).

The mean Stanford-Binet intelligence quotients for the groups run as follows: Italian, 85; Bohemian, 93; Hebrew, 98 (p. 38). The results on the Pintner-Paterson performance series are difficult to interpret. The Italian group advances, on the average, one month in Pintner-Paterson mental age over the Stanford-Binet mental age; the Bohemian group advances 5 months; the Hebrew group falls back 21 months. Although on the Stanford-Binet none of the Hebrew boys score below the 8-year level, on the performance test 45 per cent of them fail this level (pp. 39–41). This result is typical of the serious discrepancy often found between results obtained with verbal tests and with performance tests. This finding raises the question as to what extent the superior performance of Jewish children on verbal intelligence tests may be attributed to the emphasis on education characteristic of Jewish homes. The alternative explanation is that the concrete materials used in the performance tests failed to draw out the real ability of the Hebrew children. There is probably some validity in both of these suggestions.

If we judge each group by the test on which it makes the best showing (Italians and Bohemians on the Pintner-Paterson and Hebrews on the Binet), we find 25 per cent of the Italians, 46 per cent of the Bohemians, and 48 per cent of the Hebrews with intelligence quotients around 95 or over (i.e., mental ages 10.0 years or over). Similarly we find two of the

TABLE 42

Distribution of Mental Ages of 100 Italian, 100 Bohemian, and 100 Hebrew Boys, All Aged 10.0–10.9 Years *

Mental Ages in Years	Stanford-Binet Series			Pintner-Paterson Series		
	Italian	*Bohemian*	*Hebrew*	*Italian*	*Bohemian*	*Hebrew*
6.0–6.9	—	1	—	10	1	14
7.0–7.9	8	1	—	19	9	31
8.0–8.9	56	18	12	27	22	28
9.0–9.9	25	47	40	19	22	10
10.0–10.9	8	29	37	15	23	10
11.0–11.9	2	2	3	8	16	6
12.0–12.9	1	1	8	1	4	—
13.0–13.9	—	—	—	1	2	1
14.0–14.9	—	1	—	—	1	—
Total	100	100	100	100	100	100

* Adapted from Bere, *A Comparative Study of the Mental Capacity of Children of Foreign Parentage*, p. 38.

TABLE 43

Percentage of Failures in Specified Kinds of Stanford-Binet Test Items by Italian, Bohemian, and Hebrew Boys *

Test Items Grouped under General Headings [a]	Average Percentage of Failures on Each Group of Tests by Each Group of Boys		
	Italian	*Bohemian*	*Hebrew*
Vocabulary	85.16	71.5	70.83
Comparison	66.2	59.8	55.0
Comprehension	49.75	43.75	38.25
Generalization	97.5	87.0	75.5
Language control			
A	65.0	47.0	44.5
B	80.0	55.0	55.0
Association	52.5	25.0	24.0
Visualization	67.0	58.5	55.37
Memory of digits	50.0	44.0	37.0
Memory for words	66.0	60.0	62.0
Concrete problems	47.66	34.33	37.33
Pictures	48.5	48.0	38.0
Number problems	51.5	41.5	43.0

* Adapted from Bere, 1924, *A Comparative Study of the Mental Capacity of Children of Foreign Parentage*, p. 45.

[a] The reader is referred to the text for the exact items and age levels included in each group of tests.

Italians, seven of the Bohemians, and eight of the Hebrews with mental ages of 12 years or better. On the Stanford-Binet (which is more reliable than most other tests at the lower levels) 8 of the Italians, 2 of the Bohemians, but none of the Hebrews in this series of ten-year-old boys had mental ages below 8 years.

The consistent and well defined difference in average cultural-intellectual development between Jews and Italians in an American metropolitan community is shown in an analysis of New York City data by health areas for the year 1930, reported by Maller, 1933. Among other methods of treating these data, Maller grouped 15 areas that were predominantly Italian (85 per cent or more of the total population in each of these areas being Italian) and 15 areas that were predominantly Jewish (90 per cent or more of the total population in each of these areas being Jewish). He found that the children in the Jewish areas consistently showed a higher rate of school progress (ratio of accelerated to retarded pupils in each area) than the children in the Italian areas. The Jewish areas also showed higher average intelligence quotients for fifth grade pupils examined with the National Intelligence Test and the Pintner Rapid Survey Test.[4] In fact the highest average intelligence rating for any Italian area (average I.Q., 95) was slightly below the lowest average intelligence rating for any Jewish area (average I.Q., 96). The range of such averages for the Italian areas was 74 to 95, and for the Jewish areas, 96 to 123. The difference between the averages for the two groups was 18 I.Q. points, or one year and a half in mental age (*see* Figure 36). This difference cannot properly be explained as due to a handicap derived from mere foreign parentage, because a somewhat greater proportion of the children in the Jewish areas had foreign-born parents than did the children in the Italian areas. Clearly this result must be attributed to a difference in persistent family traditions or to a difference in hereditary capacities, or to both.

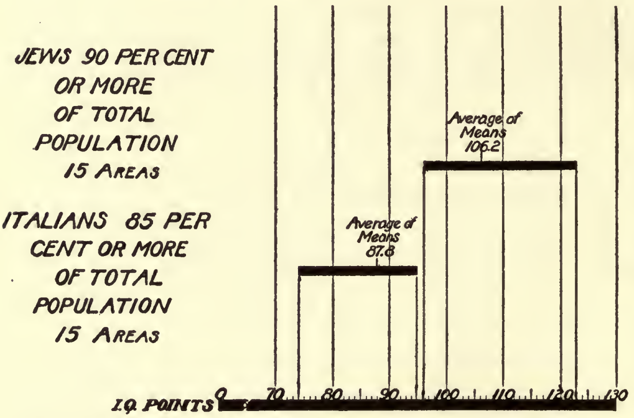

FIG. 36. RANGE OF MEAN I.Q.'S OF SCHOOL CHILDREN IN 15 JEWISH DISTRICTS AND IN 15 ITALIAN DISTRICTS, NEW YORK CITY. Data from J. B. Maller, 1933, "Vital Indices and Their Relation to Psychology and Social Factors," *Human Biology*, 5, pp. 94ff.

Negro groups in Northern cities usually make intelligence test scores which are similar to the scores made by the European groups with relatively low cultural-intellectual status. In some studies (e.g., Murdock, 1920) the Negro children have appeared to surpass some European groups.

In urban environments ethnic groups tend gradually to be broken up into different social classes. The intellectual development of the members of each social class then shows a characteristic distribution regardless of ethnic origin. Arlitt, 1921, described a careful study of 343 children in one urban locality, in the vicinity of Philadelphia. She found that before making analysis by social classes, the median Stanford-Binet intelligence quotient of 185 children of white American parentage was 21.5 points above that of 87 Italian children and 23.1 points above that of 71 Negro children. However, most of the families in the two latter groups were located in the two lower classes of the Taussig scale of social classification by occupation. When the comparison was made between these children and white American children of somewhat similar social status, difference in favor of the white children of American parentage was reduced to about 9 points. Arlitt noted, however, that in this sample there remained a somewhat higher frequency of intelligence quotients below 80 in the Italian group (41 per cent) and in the Negro group (34 per cent) than in the low-status white American group (21 per cent). The children were all born in the United States and were reported to be familiar with English. There is no precise measurement of home environments in this study, and the numbers are small. The suggestion, however, that there is an intimate relationship between ethnic differences and social class differences has been confirmed by other investigators (*see* Witty and Lehman, 1930, pp. 397–403).

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[4] It should be noted that these are group tests, so that the results must be regarded as less reliable than results obtained by the use of individual tests.

We may conclude that there are significant variations in present levels of cultural-intellectual development among various "natio-racial" groups in American cities. Such differences tend to persist in modified form, not as differences between unitary ethnic groups, but as differences between social classes comprising varying proportions of members derived from different groups.

2. *Frequency of Extreme Variations in Intellectual Development in Various Nationality Groups*

Frequencies of high and low intellectual development are related to the central tendencies of various groups, although some groups may be more variable than others. It is sometimes assumed that frequency of very superior ability or frequency of apparent mental deficiency is less subject to environmental influences than average scores. The writers doubt the validity of this assumption. It is probably true that a very ordinary child cannot be "boosted" into the class of the very superior by any amount of coaching; but among naturally bright children the passage of any specified criterion may be greatly affected by home and school influences. Similarly, it is probably extremely rare that any child of good average intelligence is forced into the class of the mentally deficient by environmental factors, except occasionally as the result of injuries affecting the central nervous system or personality disorders. Yet among children of rather inferior endowment the division between the "dull normal" and the "high-grade feebleminded" may be much influenced by environmental factors. Some types of hereditary mental defect may be due to single gene substitutions; but in general we may assume that the same multiple causes, including both genetic and cultural factors, are at work in the appearance of extreme variations as in the more ordinary variations. In short, variations in intellectual development in any large group may be expected to follow a normal frequency distribution,—and they do.

Nevertheless, data on group differences in the frequency of brilliant and deficient individuals deserve special attention, because small differences in central tendency may be associated with large differences at the extremes. The normal relation of the frequency of extreme variations in intelligence quotients to average levels is treated in Appendix R. It is there shown that a group with a mean I.Q. 4.4 points above that of some standard population may be expected to have only about 40 per cent as many persons with deficient intelligence (I.Q. below 67.7 points) and about twice as many "superior" persons (I.Q. above 126.6 points) as the standard population. On the other hand, a group with a mean I.Q. 4.4 points below that of the standard population may be expected to have 50 per cent more mentally deficient individuals and less than half as many "superior" individuals (using the same criteria as before) as the standard population. A group with a mean I.Q. 8.9 points below the standard population would normally have more than five times as many mentally deficient, and less than one-sixth as many superior individuals as the standard population.

The most extensive investigation of the incidence and nature of superior intellectual ability is that by Terman in California. Terman's main experimental group comprises 1,000 gifted children, selected on the basis of intelligence tests administered to all likely subjects in the public elementary schools of several cities in California, in the vicinities of San Francisco and Los Angeles. The criterion for selection was a (corrected) Stanford-Binet intelligence quotient of 140 or over. Terman comments on the ethnic distribution of the parents of these gifted children, as follows:

> "It is unfortunate that no very reliable data on the relative frequency of the different racial stocks represented in the cities covered by the main survey are available. However, even without such comparative figures certain items . . . stand out as significant. The percentage of Scotch is very high, as is also that of the Jewish groups, especially the Russian Jews. The English stock heads the list, but this is also probably true in the general population. The percentage of Latin blood is very low.
>
> "The proportion of Jewish blood, as it is reported, is 10.5 per cent of the total. The actual amount is probably greater than this, as there is reason to believe that the presence of Jewish blood has in some cases been concealed. According to the estimates of a number of prominent Jewish social workers, the proportion of Jews in the total population of the three main cities covered (Los Angeles, San Francisco, and Oakland) is approximately 5 per cent. According to this estimate, the amount of Jewish blood in our group is about twice the expected.
>
> "Negroes represent 2 per cent of the total of the combined population of Los Angeles, San Francisco, Oakland, Alameda, and Berkeley, and furnish three-tenths of one per cent of our gifted group [two cases, with some white ancestry in each case]. . . .
>
> "In regard to the absence of Chinese, it should be noted that the Oriental schools which the Chinese children attended were not canvassed" (p. 56).

For the 248 foreign-born parents of the gifted children an exact distribution is available by country of birth, which may be compared with the distribution of foreign-born persons in the population at large of the principal cities represented in this study (*see* Figure 37, *see also* Table 44).

TABLE 44

BIRTHPLACE OF 248 WHITE FOREIGN-BORN PARENTS OF GIFTED CHILDREN *

Country of Birth	Fathers	Mothers	Total	Per Cent of White Foreign-Born Parents of Gifted Children	Per Cent of Total Foreign-Born, Los Angeles and San Francisco	Per Cent of Quota among Parents of Gifted Children
Armenia	2	—	2	0.8	0.3	267
Australia	3	3	6	2.4	0.8	300
Austria	4	4	8	3.2	2.3	139
Belgium	2	1	3	1.2	0.4	300
Canada	14	15	29	11.7	8.2	143
Denmark	3	1	4	1.6	2.1	76
England	12	13	25	10.1	8.6	117
France	4	6	10	4.0	3.8	105
Germany	15	12	27	10.9	11.5	95
Hungary	2	2	4	1.6	1.2	133
Ireland	7	3	10	4.0	9.2	43
Italy	3	2	5	2.0	12.6	16
Mexico	—	1	1	0.4	10.1	4
Netherlands	3	—	3	1.2	0.6	200
Norway	5	2	7	2.8	1.9	147
Poland	3	5	8	3.2	1.7	188
Rumania	7	7	14	5.6	0.7	800
Russia	35	25	60	24.2	6.1	397
Scotland	3	4	7	2.8	2.5	112
South America	1	—	1	0.4	0.4	100
Spain	1	—	1	0.4	1.3	31
Sweden	5	5	10	4.0	4.5	89
Wales	1	—	1	0.4	0.4	100
Pacific Islands	—	2	2	0.8	0.3	267
			248	99.7		

* From Terman, 1925, *Mental and Physical Traits of a Thousand Gifted Children*, p. 59.

Because of the small numbers no importance can be attached to variations between minor groups from Armenia, Australia, Belgium, and so forth, shown in the table above. Among the larger groups some superiority is suggested for the British (Canada, England, Scotland, and Wales, if combined), but hardly for the Germans or Scandinavians (Denmark, Sweden, and Norway, if combined), who apparently just about meet expectations. The Irish fulfill about one-half their quota; Italians fulfill 12 per cent; but Mexicans, as might be expected in view of their background, are very meagerly represented in the experimental group. Since Jews from Russia, Rumania, Poland, Austria, and elsewhere, combined, apparently doubled their quota, the high frequencies reported are not necessarily significant with reference to the gentiles from these areas.

Data on the frequency of mental deficiency among the children of immigrants as compared with children of native parentage are afforded by the extensive examination of public school children in Massachusetts, including individual examination of all retarded children. These data, however, carry us only a single step, namely, as far as the distinction between children born of native and children born of foreign mothers. It appears that in the towns represented in a sample of 10,455 retarded children reported by Dayton, 1929, 68 per cent of the retarded children and 73 per cent of the children described as "mentally defective" (I.Q. less than 70) had foreign mothers. Only 43 per cent of the women aged 20–44 years in the corresponding general population were foreign-born. But according to data presented by Dayton in the same article, we may assume that the foreign-born mothers had, on the average, 4.2 children, whereas the native mothers had, on the average, only 2.8 children. Therefore, we may infer that about 53 per cent of the children in the general population had foreign-born mothers. The ratio of the proportion of foreign women among mothers of mentally defective children to the proportion of foreign women in the general population would then appear to be 73 to 53, or about 1.4 to 1. But this result may be due to special environmental handicaps of children of foreign parentage. The study does not supply any information about the comparative frequency of apparent mental deficiency among different European stocks.[5] Data regarding the frequency of low intelligence quotients in different race and nativity groups have already been presented or implied in our review of variations in average levels and distribution of cultural-intellectual development in these groups.

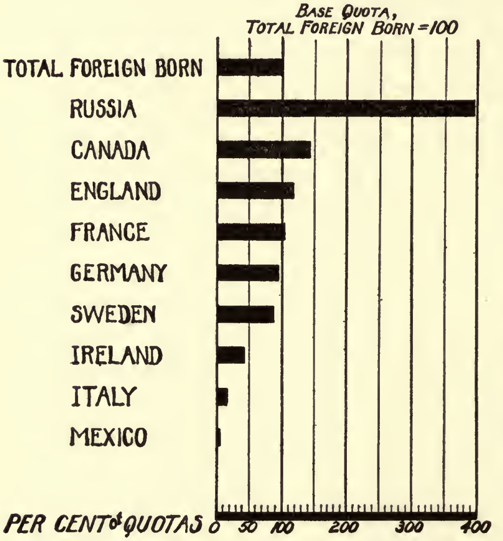

FIG. 37. FREQUENCY OF GIFTED CHILDREN IN THE TERMAN SERIES BY NATIONAL ORIGIN IN RELATION TO EXPECTATION ON BASIS OF TOTAL POPULATION. Data from Lewis M. Terman, 1925, *Mental and Physical Traits of a Thousand Gifted Children*, p. 59.

The most comprehensive data on the incidence of mental deficiency in the United States are derived from army statistics for the war period;

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[5] Slightly one-half of the foreign-born population of Massachusetts at this time was made up by four groups: Irish, British Canadian, Italian, and French Canadian.

but the European stocks in this series are classified only by country of birth, so the data obviously have reference only to the first generation, the immigrants. Inasmuch as all immigrants who are obviously defective are, supposedly, refused admission to this country, rates of mental deficiency for the children of immigrants might differ considerably from rates for the immigrants themselves.

There are two separate sets of army data on mental deficiency, (1) derived from local board rejections, and (2) derived from rejections recommended by army psychiatrists, based on individual examinations of men spotted through routine group tests or referred by line officers. No racial analysis is possible in the case of the local board rejections. Variations in local board rejection rates, and variations in camp rejections, separately for white and colored, will be examined in a later section.

TABLE 45

Camp Neuropsychiatric Diagnoses of Mental Deficiency, United States Army, World War, White Forces Analyzed by Country of Birth *

Country of Birth	Estimated Total Forces [b]	Mental Deficiency Rate per 1,000 Men	Mental Deficiency Rate per 100 Neuropsychiatric Cases
All countries including United States	3,606,037	4.9	29.2
Austria-Hungary, including Czechoslovakia and Jugoslavia [a]	24,470	6.0 [a]	31.8
Canada	29,588	2.4	21.4
Denmark, Sweden, and Norway	42,603	1.3	15.8
England, Scotland, Wales	31,690	.9	9.3
France	3,564	2.7	20.4
Germany [a]	13,321	3.5 [a]	25.7
Greece	17,768	3.2	24.0
Holland	4,158	2.1	18.0
Ireland	29,649	1.9	15.0
Italy	115,644	5.5	32.5
Poland	24,654	5.8	43.5
Russia [a]	71,604	7.4 [a]	32.1
Switzerland	2,267	.9	6.5

* Psychiatric data from Bailey, *et al.*, *Neuropsychiatry*, p. 214. Base figures from United States War Department, unpublished data.

[a] Discrepancies due to confusion in classification by country of birth, probably influence rates in second column, but not those in third column.

[b] *See* text for method of estimating total forces.

The original data on camp rejections by country of birth are given only in absolute figures and in rates per 100 total psychiatric cases. This procedure, by itself, is unsatisfactory. These results, however, may be checked against another series of rates. The two series in conjunction will afford fairly reliable results. No analysis of total United States forces, during the war period, by country of birth is available. Such analysis is available, however, for all applicants for bonus (adjusted compensation), prior to December 31, 1928. These applicants constitute 78.5 per cent of the original forces.[6] Assuming a pro rata distribution of bonus applicants, the total number of men of foreign births from each country may be estimated. Tolerably accurate results may be excepted in this way except in the case of Austria, Germany, Poland, and Russia. It is possible that the changes in the map of Europe during this period would cause some disparity between our estimated base numbers and true base numbers for these countries—tending to make the rates for Austria, Germany, and Russia appear somewhat too high, and the rate for Poland somewhat too low. The two series of rates are shown in the table given above. Except for discrepancies which may be attributed to the difficulty just mentioned, the two series check very well.

Bearing in mind the points mentioned above, the highest true rate is probably indicated for Poland, but it may be that immigration officials found it more difficult to detect mental deficiency among Polish immigrants than among those speaking more familiar tongues. Next come Austria, Italy, and Russia, perhaps with somewhat similar true rates of mental deficiency. These are the only countries showing rates of mental deficiency above those for the total white forces from all states of the United States combined. Because of the selective character of accepted immigrants and the foreign-language difficulties involved in testing foreign-born men, it is impossible to attach much importance to these variations.

No reliable computation is possible of total numbers of Indians or Mexicans (both classed as "whites" in army statistics) among total United States forces. However, as might be expected, extremely high proportions of mental deficiency to all neuropsychiatric cases are reported: 62.9 per cent in the case of Indians, 66.9 per cent in the case of Mexicans—in contrast to 31.5 per cent for the total sample, or 48.3 per cent in the case of Negroes. For total white forces there were 4.9 rejections for mental deficiency on recommendation of army psychiatrists per 1,000 men. The corresponding rate for Negroes from twelve Northern states[7] with 1,000 or more Negro recruits is only slightly higher, 5.4 rejections per 1,000 men. The rate is much higher, however, for Southern Negroes, making an average for the total United States of 10.1 rejections per 1,000 Negro recruits (*see* Section 5, this chapter).

3. *Regional Variations in the Cultural-Intellectual Development of Minority Groups*

Most American Indians, most recent immigrants from Mexico, and a large proportion of Negroes in the United States live under conditions which afford so little stimulus to intellectual development that it is quite impossible to estimate their capacities by the use of ordinary intelligence tests. Garth and his associates, using group tests, report median intelligence quotients as low as 68.6 for 1,050 full-blooded Indians in reservation schools in the Southwest, 75 for 1,272 Negroes in Texas, and 78 for 1,004 Mexicans in Texas, New Mexico, and Colorado. (1931, pp. 73–75 and 78.) But Hirsch likewise reports an average intelligence quotient of 72.5 for 904 East Kentucky Mountain children who represent the nearest approach to a pure Anglo-Saxon population which can be found anywhere in the United States, living in an area where there has been little opportunity for intensive selective migration (pp. 200–201). Somewhat higher scores have been obtained for all these groups with individual tests and performance tests, but these tests only partially eliminate the peculiar influence of primitive environments and meagre educational opportunities.

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[6] Communication from Adjutant General's Office, World War Division, July 31, 1931.

[7] California, Connecticut, Illinois, Indiana, Iowa, Kansas, Massachusetts, Michigan, Missouri, New Jersey, New York, Ohio, and Pennsylvania.

In order to reduce the influence of such extreme environmental variations we limited the presentation in the first section of this chapter to data for Northern urban localities, where large foreign elements meet, where race discrimination is less intense than in the South, and where a fairly uniform public school system is in force.[8]

The Mexican population of the United States is recent, largely rural, and drawn from provinces with very low economic and cultural levels (*see* Chapter VI). Critical studies of variables influencing the intellectual development of Mexicans have been undertaken, but it is impossible at the present time to secure any accurate idea of the hereditary intellectual capacities of these people. The present level of intellectual development, as reported by Garth and others, is low.

We can say little more about the Indian population. It would seem likely that there may be wide variations in native ability between different tribes, but, if such differences exist, we cannot define them at present. Very few critical studies have been made of Indian intelligence using individual tests. Jamieson and Sandiford found that the median intelligence quotient of a large group of Southern Ontario Indians was 97 on the Pintner Non-Language Test, and 92 on the Pintner-Paterson Performance Tests, but only 80 on the National Intelligence Test (a verbal group test) and still lower on the Pintner-Cunningham Primary Test. Even these low scores are higher than those obtained with group tests by Garth on Indians in the Southwest. According to an opinion received from an expert in the United States Bureau of Indian Affairs, the morale of most of the tribes in the North is higher than that of most of the Indians in the Southwest, with some important exceptions, such as the Navajo. Most authorities attribute such differences to cultural influences. A more intelligent educational policy than that pursued in the past with American Indians is just now being evolved by the national government.

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[8] Davenport and Steggerda, 1929, attempted to eliminate environmental differences through a study of pure Negro, part Negro, and white groups in Jamaica, but the process of sampling in this study was not sufficiently objective to afford reliable results in the psychological field.

The observation of variations in the intellectual development of Negroes in different parts of the United States is fundamental in the study of the potentialities of the Negro group. The extent of such variations is shown by a comparison of all army Alpha scores for white and Negro forces from different states. These ratings include the scores of men who were also given Beta or Individual Examinations, but exclude the scores of those who were initially classified as illiterate, and so were sent directly to Beta examinations.

TABLE 46

MEDIAN ALPHA SCORES OF WHITE AND NEGRO RECRUITS, UNITED STATES ARMY, FIVE NORTHERN STATES, EIGHT SOUTH CENTRAL STATES *

	Median Alpha Score, White Recruits	Median Alpha Score, Negro Recruits
Five Northern states:		
New York	58.3	38.6
Pennsylvania	62.0	34.7
Ohio	62.2	45.5
Indiana	55.9	41.5
Illinois	61.6	42.2
Eight South Central states:		
Kentucky	41.5	23.9
Tennessee	44.0	29.7
Alabama	41.3	19.9
Mississippi	37.6	10.2
Arkansas	35.6	16.1
Louisiana	36.1	13.4
Oklahoma	42.9	31.4
Texas	43.4	12.1

* From data by Yerkes, Editor, 1921, "Psychological Examining in the United States Army," *Memoirs of the National Academy of Sciences*, Vol. 15, Tables 205, 206, pp. 689, 730.

The average of median scores of Negro recruits from the five Northern states here listed is 40.4. The average of median scores of white recruits from the eight South Central states is practically identical, 40.3. In short,

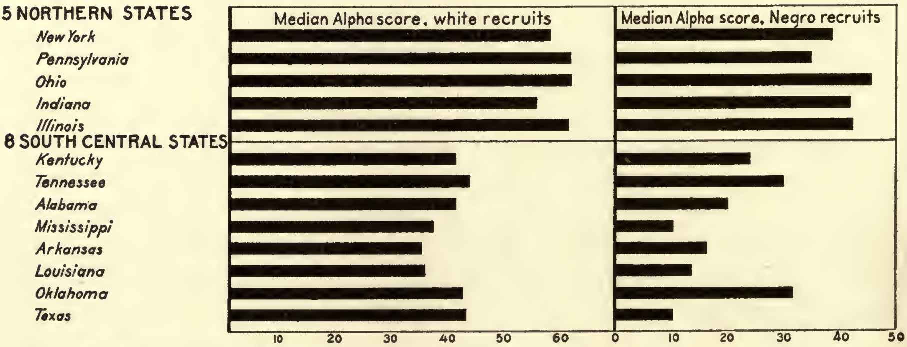

FIG. 38. MEDIAN ALPHA SCORES OF WHITE AND NEGRO RECRUITS, FIVE NORTHERN STATES AND EIGHT SOUTHERN STATES. Based on data from Robert M. Yerkes, editor, 1921, "Psychological Examining in the U. S. Army," *Memoirs of the National Academy of Sciences*, Vol. 15, pp. 689, 730.

Northern Negroes (who are predominantly urban) and whites in some parts of the South (who are predominantly rural) show very similar degrees of intellectual development. Whites in Northern states stand well above this level. Negroes in Southern states fall far below it (*see* Figure 38).

4. *Regional Variations in Cultural-Intellectual Development in the Total White Population*

In general, lower intelligence test scores are associated with rural environment than with urban environment—and in the most remote rural districts very low scores are frequent. For example, Van Wagenen, in a study of Minnesota children in Grades VII and VIII (4,000 rural children and 8,000 town and city children) found the seventh grade rural pupils four months lower in average mental age than the urban pupils, and eighth grade rural pupils six months more retarded than the urban pupils. Book, in a study of children in Grades III to VIII in one county in Indiana, found that, at all ages under 15 years, the city children had median I.Q.'s more than 10 points above those of the rural children. The results obtained by Woody in a Michigan study are shown below (*see* Table 47).

TABLE 47

AVERAGE SCORES ON NATIONAL INTELLIGENCE TEST OF MICHIGAN SCHOOL CHILDREN GROUPED ACCORDING TO SIZE OF COMMUNITY *

	Under 5,000	5,000 to 10,000	Population over 10,000
Grade III	34.0	36.7	40.2
Grade IV	58.0	66.3	68.4
Grade V	79.3	89.0	90.0
Grade VI	98.1	106.1	109.6
Grade VII	117.2	123.1	126.0
Grade VIII	133.1	142.2	141.6
Unweighted average of mean scores of grades	86.6	93.9	95.9

* From Woody, 1924, *Results Obtained from Ability Grouping*, p. 4.

The retarded intellectual development of families in extremely isolated areas is indicated by many studies. For example, Hirsch gives mean scores on Dearborn A and C group intelligence tests for school children in isolated mountain communities of east Kentucky, as shown here in Table 48. Similar results have been obtained by other investigators in the Southern Appalachian Highlands.[9]

The data already presented are sufficient to indicate the general character and some of the variations in results obtained in the use of gross data regarding rural-urban contrasts in intellectual development.

Differences in intellectual development between various racial and na-

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[9] The reader is again reminded that these results in some cases may have *no significance* for hereditary capacity. The causal interpretation of these results will be considered in later sections (*see* Chapter X, Section 2).

TABLE 48

MEAN INTELLIGENCE QUOTIENTS (DEARBORN) OF EAST KENTUCKY MOUNTAIN SCHOOL CHILDREN *

Name of School	Number of Children	Mean Intelligence Quotient
Y— Creek [a]	35	75.6
O— Branch	27	74.8
B— Branch	62	74.0
S— Show [b]	15	73.4
K— Mining School [a]	53	78.8
Bri—	26	75.4
Tro—	30	66.2
Old C—	32	76.0
M— Creek	31	69.0
J— Fork	22	71.8
L— Creek	62	70.8
Div.— [b]	21	65.3
Big W— C— [b]	21	66.5
Hen— [b]	23	68.2
Ma—	20	78.0
Hol— [b]	13	64.3
Iv—	17	80.5
Jon	20	74.8
Upper B— [b]	42	67.4
B— Springs	67	73.9
P— Creek	28	73.1
P— H—	33	73.2
Ho—	20	68.9
En—	20	69.5
B— Mission	16	70.2
L— L—	29	67.0
M— L— [a]	34	72.7
H— C— [a]	41	74.1
Is— Creek	44	68.3
	904	72.5

* From Hirsch, 1928, *An Experimental Study of the East Kentucky Mountaineers*, pp. 200, 210.

[a] These schools are located in mining districts and are maintained either by the counties or by the counties and mine owners.

[b] In these school districts there has been very close intermarriage and often there are but two or three surnames in the school.

tional groups have usually been given greater attention than differences between various sections of the United States. For example, the authors of *Psychological Examining in the United States Army* devoted much attention to the former set of data but hesitated to exhibit the latter set with equal visibility. As a matter of fact, however, the army data on differences between the white draft from different states are quite as striking as differences between racial and national groups.

State variations in the intelligence test scores of drafted men may be correlated with other indices of cultural-intellectual development and of social and economic status. We will then compare and combine several different items in studying cultural-intellectual development. We will use data from army statistics at the time of the World War, from the Census of

1920, and other data collected within a few years of this time. The following are the indices selected for this purpose:

(1) The median scores of supposedly random samples of the white draftees of each state on Army Alpha Intelligence Examinations.

(2) The percentage of superior scores, Grades A and B, derived from the same series.

Notes: The "white draft" in this analysis includes some Indians and Mexicans, and this inclusion may affect results in several South-Western states.

No distribution of scores is available for Arizona. In order to make the following series complete, the mean values of three adjoining states, New Mexico, Nevada, and Utah are assigned to Arizona.

The Army Alpha is a verbal test dependent on knowledge of English. In some cases, however, the scores of men who first took the Alpha examination by mistake, and were later sent to Beta (non-language) examination are included. This has evidently happened, to a peculiar degree, in the New Jersey sample, which includes a large number of zero scores, out of all proportion to the number of such scores in other samples. The Army rejections for mental deficiency are not high for New Jersey. Therefore, the proportion of zero scores found in the aggregate sample is substituted in the New Jersey series, all scores above zero being retained as reported.

(3) The circulation, 1922, per 100 total population (white and colored), of ten widely-read magazines, derived by Reeder, and reported by Bagley (p. 168).

If separate data for whites only were available, the position of several Southern states, relative to one another, would probably be changed; but even on the extreme hypothesis that no magazines were taken by Negro families, no Southern states except Florida, Delaware, and Maryland would be raised above any Northern state except Missouri.

(4) Similar figures for a list of thirteen "high-brow" magazines (*ibid.*, p. 169).

(5) A calculation by Visher, reported by Bagley, of representatives in *Who's Who in America, 1924-1925*, according to birth state, in proportion to the total population of persons in each state in the years 1850, 1860, 1870, 1880, with double value for the year 1870 (*ibid.*, p. 170).

Note: Population data for 1850–1880 are not available for Oklahoma. In order to supply a comparable figure, the mean value of the other states in the West South Central section (Texas, Arkansas, and Louisiana) is assigned to Oklahoma.

(6) The number of illiterates per 100 native white persons of native parentage in each state in 1920, as reported by the Census.

(7) An index of irregularities in age-distribution curves based on 1920 census data for native whites of native parentage, by states, such as

TABLE 49

Rank Order of State Populations as Regards Indices of Cultural-Intellectual Development *

States in Order of Rank on Army Alpha Median Scores, White Draft	Rank Order on Each of Six Other Variables					
	Army Alpha Examination, White Draft. A–B Grades	*Magazine Circulation per 100 Population, 1922*		*Who's Who in America, 1922–1924 per 10,000 Avg. Population 1850–1880*	*Illiterate per 100 Native White of Native Parentage 1920. Inverse Rank Order*	*Inaccuracies in Native Whites of Native Parentage, Census Data, 1920. Inverse Rank Order*
		"Widely Read" List	*"High-Brow" List*			
Washington	......	......	......	......	......	......
Oregon	......	......	......	.....	.....	......
California	......	......	......	....	......	...
Connecticut	......	.....	.....	......	.....	....
Montana	.....	......	.....	....	......	......
Massachusetts	......	......	......	......	......	.....
Colorado	......	......	.....	.....	...	...
Nebraska	....	....	...	....	.....	....
Wyoming	.....	......	......	....	.....	.....
Kansas	...	...	...	...	....	....
Idaho	.....	.....	....	...	......	...
Iowa	.....	.....	...	....	.....	.....
Ohio	......	.....	.....	.....	....	.....
Pennsylvania	.....	...	....	...	....	.....
Illinois	....	....	....	....	...	.....
Vermont	......	.....	......	......	...	....
Minnesota	....	....	....	.....	.....	......
Nevada	...	......	......	...	.....	..
Rhode Island	..	....	.....	......	.....	....
Utah	....	...	....	......	......	.....
Michigan	....	.....	....	....	....	......
New York	...	....	.....	.....	....	.....
S. Dakota	....	....	...	.....	......	......
Maine	.....	.....	.....	.....	...	..
Missouri	....	...	...	..	..	..
Arizona	...	....	....	..	...	...
Virginia	...	..	..	...	.	..
Wisconsin	....	...	...	....	.....	......
Indiana	..	....	..	...	...	....
Maryland	..	..	...	...	...	....
W. Virginia	...	..	..	..	..	..
N. Dakota	.	...	..	......	......	......
N. Hampshire	.....	.....	......	......	....	...
Florida	.....	...	....	.	..	...
N. Jersey	....	...	.....	....	....	....
N. Mexico	..	..	..	.	.	...
Delaware	..	..	...	.....	...	.
S. Carolina	.	.	.	..	.	.
Tennessee	..	.	.	..	.	.
Texas	.	..	..	..	..	..
Oklahoma	..	..	..	.	..	..
Kentucky	.	.	.	..	.	...
Alabama	..	.	.	.	.	.
Georgia	..	.	.	.	..	.
N. Carolina	.	.	.	..	.	.
Mississippi	.	.	.	.	..	.
Louisiana	.	..	..	.	.	.
Arkansas	.	.	.	.	..	..

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* *See* Appendix M.

omission of children under 5 years of age and abnormal concentration at certain popular ages, e.g., 5, 10, 20, as reported by Huntington, 1927, pp. 301–302.

> *Note:* Responsibility for such inaccuracies may be divided between the general public and local census enumerators but in either case reflects the intellectual-cultural level of different communities.

Average values by states for these seven items are reduced to comparable "standard scores" by dividing the deviations from the mean of each series by the "standard deviation" of that series. The algebraic sum of three standard scores is then taken as an *index of cultural-intellectual development by states,* about 1920. The rank order of states on this index is given in Table 51. The numerical values are given in Appendix M.

The correlation between the various items in this composite score is especially striking in view of the fact that two of the items (Army Alpha Medians, and Army Alpha A-B Grades) refer only to total white populations, and two (illiteracy and census errors) to native white of native parentage, whereas the other items refer to total state populations. This correlation is shown in Table 49, on the previous page. In order to simplify presentation the ranks of the various states (48 to 1) in the case of favorable items, and the inverse ranks (1 to 48) in the case of unfavorable items are represented in 6 groups, as follows:

Favorable Factors	Unfavorable Factors	Symbol
41–48 (high score)	1–8 (low score)	......
33–40	9–16	.....
23–32	17–24	....
17–24	25–32	...
9–16	33–40	..
1–8 (low score)	41–48 (high score)	.

Bagley, in studying the relation between efficiency of educational systems and general level of intellectual development, used data for twenty-six states which have had sufficiently constant native population so that in 1910 a majority (55 per cent or more) of inhabitants were classified as natives of their state of residence. Bagley worked out ratings of school efficiency on a simplified form of the Ayres index (omitting all financial items except per pupil expenditure). He correlated the average rating for school efficiency with such items as have already been described: (1) per cent of Army Alpha A and B Grades (white draft), (2) circulation of ten widely-read magazines, (3) rate of representation in *Who's Who in America,* and (4) per capita income, 1919.[10] The zero order correlations in this series run as follows[11] (p. 81):

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[10] The Army Alpha data used above, are drawn directly from the source data, and the income data from the volume by Leven. Bagley's data on A and B Army Alpha Grades are derived from Sandiford, and the income data (1919) from Knauth.

[11] In view of the complexity of the situations involved, the second-order correlations worked out by Bagley (not reproduced here) are difficult to interpret.

TABLE 50

COEFFICIENTS OF CORRELATIONS BETWEEN VARIOUS INDICES FOR TWENTY-SIX STATES *

	A & B Alpha	Magazines	Leaders	Income	School Efficiency
A & B Alpha		0.91	0.87	0.73	0.88
Magazines	0.91		0.85	0.84	0.97
Leaders	0.87	0.85		0.71	0.91
Income	0.73	0.84	0.71		0.88
School efficiency	0.88	0.97	0.92	0.88	
Averages	0.85	0.89	0.84	0.79	0.91

* From Bagley, 1925, *Determinism in Education*, p. 81.

The relationship between cultural-intellectual development in the several states and income, school expenditure, nativity, and rurality is shown in Table 51 which is constructed in the same fashion as Table 49.

It is apparent that there is a high correlation between various indices of cultural-intellectual development and indices of economic status and efficiency of school systems. There is also a positive correlation between intellectual development and percentage of persons of foreign or mixed parentage in the native white populations. There is, as we should expect, a negative correlation between intellectual development and rurality, as measured by percentage of total population living on farms—with significant exceptions, since many of the rural states rank well up in the list. We may then conclude that there are large variations among state populations in cultural-intellectual development; but these variations are related to equally wide variations in economic status and other social conditions.

5. *The Regional Distribution of Mental Deficiency*

A primary difficulty in studies of the distribution or the nature of mental deficiency is the lack of any uniform criteria of such a character as to make possible accurate scientific results. The criterion most used at present is adequacy of social adjustment. This is endorsed, for example, by the Mental Deficiency Committee of Great Britain. According to this committee, "The only really satisfactory criterion of mental deficiency is the social one, and if a person is suffering from a degree of incomplete mental development which renders him incapable of independent social adaptation and which necessitates external care, supervision and control, then such a person is a mental defective" (Great Britain, Mental Deficiency Committee, *Report*, p. 13). It is desirable to retain this personal and social criterion for administrative purposes, but objective, quantitative determinations are the *sine qua non* of scientific procedure.[12] It is also essential to take account of physical as well as mental characteristics in the classification of mental

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[12] The British committee, cited above, made extensive use of such objective criteria in the mental deficiency survey of England and Wales, 1925–1927.

TABLE 51

RANK ORDER OF STATE POPULATION IN SEVERAL SELECTED INDICES: CULTURAL-INTELLECTUAL DEVELOPMENT, ECONOMIC STATUS, SCHOOL EFFICIENCY, FOREIGN STOCK, AND RURALITY. PERIOD OF WORLD WAR AND FOURTEENTH CENSUS (1920)

States in Order of Rank on Composite Score of Cultural-Intellectual Development	Per Capita Income 1920	School Expenditures per Pupil 1919–1920	Per Cent Foreign or Mixed Parentage in Native White Population. 1920	Per Cent Living on Farms of Total Population. 1920
Washington	.....	......	....	..
California	......	.....	.....	.
Massachusetts	......	......	......	.
Oregon	.....	....	....	...
Connecticut	......	....	......	.
Wyoming	......	......	....	...
Colorado	....	...	...	...
Vermont	....	.....	....	....
Montana	....	......	.....	....
Ohio	.....	....	...	..
New Hampshire	....	.....	.....	..
Minnesota	...	.....	......	....
New York	......	....	......	.
Rhode Island	......	...	......	.
North Dakota	..	......	......	......
Iowa	..	......	....	....
Utah	...	....	.....	...
Idaho	...	.....	...	.....
Nebraska	...	.....	....	.....
Michigan	.....	....	.....	..
Nevada	......	......	.....	..
Illinois	.....	....	.....	.
South Dakota	..	.....	.....	......
Pennsylvania	.....	...	....	.
Maine	....	...	...	..
Wisconsin	....	...	......	....
New Jersey	......	.....	......	.
Kansas	...	....	...	....
Indiana	....	...	..	...
Arizona	.....	......	....	...
Maryland	.....	..	...	..
Florida	..	..	..	...
Missouri	...	..	...	....
Delaware	....	...	...	..
West Virginia	...	..	..	...
Virginia	..	..	.	.....
Oklahoma	..	..	..	.....
Texas	...	..	..	.....
New Mexico	..	...	..	.....
Kentucky	.	.	..	.....
Tennessee	.	.	.	.....
Alabama	.	.	.	......
Georgia	.	.	.	......
South Carolina	.	.	.	......
North Carolina	.	.	.	......
Arkansas	.	.	.	......
Louisiana	..	..	..	....
Mississippi	.	.	.	......

deficiency. Such classification may afford cues in some cases to important primary or contributory causal factors.

In the various regional surveys, conducted under the auspices of the National Committee for Mental Hygiene, different systems of classification are used by different directors. Some do, and others do not, introduce a class of "mentally subnormal" between the "borderline feebleminded" group and the "dull." Few of the reports divide the mentally deficient as regards grades of deficiency. None of these reports includes any exact statement of methods or criteria, although practically all record that classification was based on examination of record and personality traits as well as individual psychometric examination.

In spite of unsatisfactory methods of classification commonly employed, the data already available on the distribution of mental deficiency in the United States deserve more systematic presentation than they have yet received. The most comprehensive set of materials on the incidence of mental deficiency in the population of the United States are derived from the army data. In army procedure, criteria varied in different localities, especially in the case of local board rejections. Fortunately, however, we have two wholly distinct sets of army data; local board reports and psychiatric examinations of men already mobilized. This makes it possible to check one set of data against the other so as to obtain far more conclusive results, in some instances, than would otherwise be possible. So far as we are aware, this procedure has never been carried out before, but it seems to be very obviously demanded. In fact, regional rates for camp rejections, relative to total forces, have not previously been reported on the basis of the data presented by Bailey and others in *Neuropsychiatry*. In this volume, the only comparative rates for mental deficiency by states are percentages of mental defectives per total psychiatric cases. We received, by courtesy of the War Department, a record of total white forces (including Indians and Mexicans) and total Negro forces contributed by each state, on which the rates, shown below, for frequencies of camp diagnoses of mental deficiency are based. We use the data on rejections by local boards from *Defects Found in Drafted Men* by United States Surgeon General's Office, Love and Davenport, 1920, taking the data on army rejections from *Neuropsychiatry* by United States Surgeon General's Office, Bailey, Williams, and Komora, 1929.

The army procedure apparently followed a "rule-of-the-thumb" in the diagnosis of mental deficiency. Social criteria were, of course, chiefly taken into account by the local boards in filling draft quotas. Camp neuropsychiatrists were instructed, as follows, "Look for defect in general information with reference to native environment, ability to learn, to reason, to calculate, to plan, to construct, to compare weights, sizes, etc.; defect in judgment, foresight, language, output of effort; suggestibility, untidiness, lack of personal cleanliness, anatomical stigmata of degeneration, muscular awkwardness. Consult psychometric findings. Get history of school and vocational career and disciplinary report" (Bailey *et al.*, p. 68). "In the consideration of mental deficiency, the standard for rejection was not always uniform, although generally understood to be a mentality of or below that of a child of 8 years. . . . It was not always possible to arrive at a scientific determination of the mental age of recruits as the time required for the necessary examination was often not available. . . . Throughout the entire group of neuropsychiatric disorders much latitude was necessarily left to the opinion of the neuropsychiatric examiners" (*ibid.*, pp. 69–70). The circumstances of the army examinations, however, dictated a conservative, albeit a hasty procedure. The examiners, it is mentioned, "had to overcome the disinclination of others to allow the rejection of a man who looked healthy and strong" (*ibid.*, p. 82).

Among the whites diagnosed as mentally deficient 32.1 per cent have never been to school, 89 per cent are described as of "marginal economic status," and the combined frequency of admitted venereal disease (without correction for overlapping) is 16.4 per cent. Among the Negro psychiatric cases, so reported, these percentages rise to 68.8 per cent, 97.4 per cent, and 72.9 per cent, respectively. In such a concatenation of deficiency, ignorance, poverty, and disease, the theoretical problem of assigning proper weight to various causes is almost as baffling as the practical problem of effecting any amelioration, at least apart from the possibilities of limitation of reproduction (*see* Appendix O).

Love and Davenport report 39,787 cases of mental deficiency, including 33,636 rejections by local boards (p. 1230). The rate of rejections for mental deficiency by local boards is calculated as 8.94 per 1,000 men examined (Love and Davenport, p. 1238). It is important to note, however, that the local board data include some duplicate records, since part of the men available for draft were examined twice. This may add a fictitious increase of as much as 30 per cent or 40 per cent in some areas. The true rate of mental deficiency rejections by local boards is probably about 6 or perhaps 7 per 1,000 men.

A total of 21,858 men were diagnosed as mentally deficient by the army psychiatrists, of whom 18,785 were recommended for discharge (Bailey *et al.*, pp. 176, 178). Accepting the figure of 4,006,527 total forces supplied by the War Department, we obtain a ratio of 5.45 cases of mental deficiency per 1,000 persons originally accepted for military service. Combining army psychiatric data with local board data and making allowance for duplicate reports from local boards, we obtain an incidence rate of 12 per 1,000. The number of institutionalized feebleminded persons is so small that it would not appreciably affect this result.[13] It is possible that in applying this figure to the general population some correction should be made for sex distribution, but this is not certain. Mental hygiene surveys of communities and school populations usually show somewhat higher incidence of severe mental deficiency among males (*see* Bridgman, 1929). On the other hand, in view of the high death rates of mentally deficient children, the corresponding incidence among children must be considerably higher. An estimate of 2 per cent as the frequency of serious mental deficiency among school children would then seem to be fairly conservative.

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[13] The number of institutionalized feebleminded in different states bears no relation to the numbers of all such persons in the total population. According to the most complete recent U. S. Census report (1923), there were 42,954 patients in institutions for the feebleminded in the United States, giving an average ratio of 0.39 per 1,000. The highest ratios are found in Massachusetts, New Hampshire, and Minnesota, with 0.76, 0.88, and 0.77 per 1,000 population, re-

School surveys in Massachusetts, Minnesota, and California, based purely on intelligence test results, have indicated an average of 4 or 5 per cent of "mental defectives" among children in the general population, on the basis of I.Q. 70 or less (in some studies) or 75 or less (in other studies). All of these states show comparatively low frequencies of rejections for mental deficiency according to the army statistics. It is probable, however, that many of these children would escape classification as mentally defective if the usual social criteria were taken into account.

A high incidence of mental deficiency in Northern New England is apparent in the army data. In Maine a ratio of 16.7 per 1,000 men (with a much higher ratio for the coast counties) is reported by local boards and 7.5 per 1,000 forces by camp psychiatrists. In Vermont the ratio for rejections by local boards is 27.1 but the ratio for reports by camp psychiatrists is only 3.1 per 1,000. This suggests that the very high ratio for rejections in Vermont may be due in part, at least, to unusually high local board standards—exaggerated by duplicate reports, which might add a fictitious increment up to 30 or 40 per cent in some instances. On the other hand, in New Hampshire, Massachusetts, and Connecticut, where local board rejections were only 7.4, 8.0, and 8.0 per 1,000 respectively, the rejections by camp psychiatrists were also very moderate, 2.4, 2.7, and 3.0 per 1,000. This comparison clearly shows a significant difference in frequency of mental deficiency between the rural districts of Northern New England and urban Southern New England (the percentage of urban population in 1920 in New Hampshire, Massachusetts, and Connecticut being 63.1, 94.8, and 67.8, respectively, in contrast to 35.3 in Maine, and 27.8 in Vermont). Rhode Island shows a much higher frequency of mental deficiency than the other Southern New England states, although not so high as Maine and Vermont.

Differences in frequency of mental deficiency reported by camp psychiatrists between white and Negro forces from Northern states are small. Usually, but not always, they appear to be favorable to the whites. The interpretation of figures for Southern states is hampered by the lack of racial analysis in local board returns. It has frequently been suggested that the

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spectively. These figures do not include an additional 12,183 reported feebleminded persons in almshouses in the United States. (U. S. Bureau of the Census: *Feebleminded and Epileptics in Institutions, 1923;* pp. 25–26).

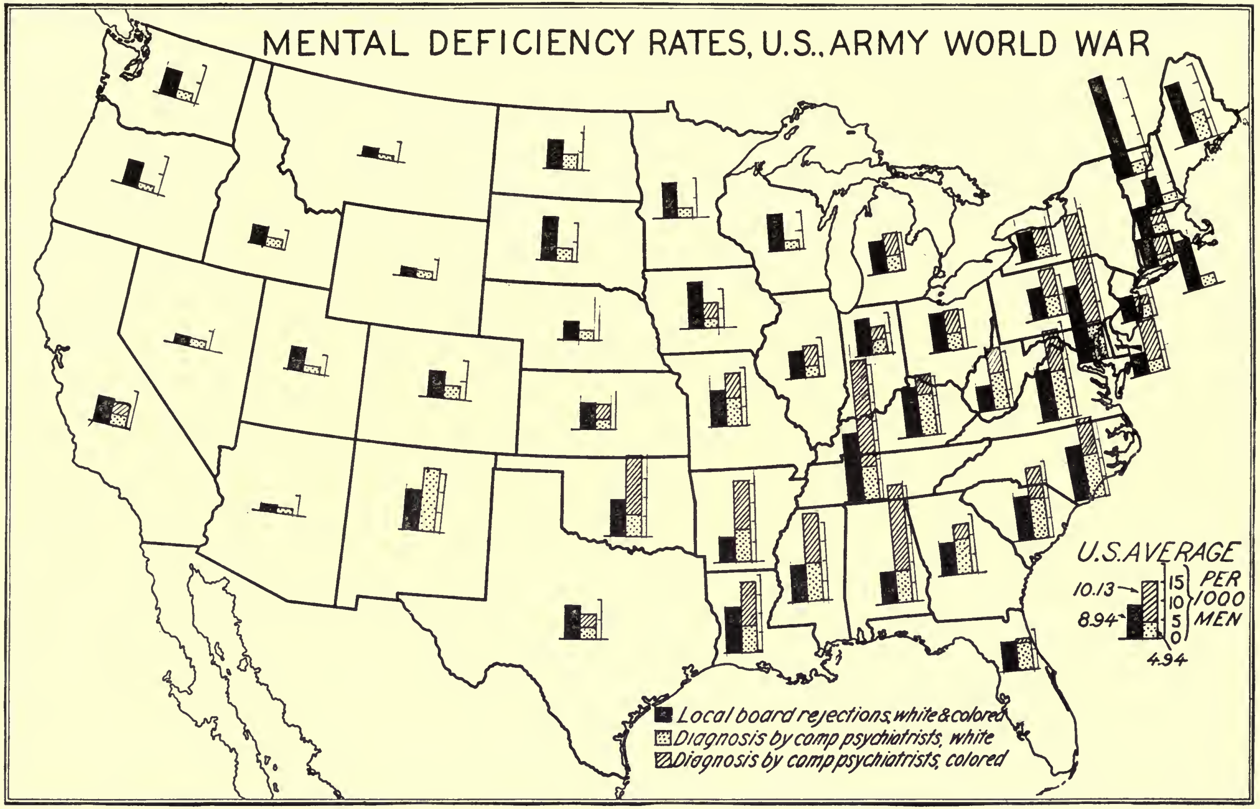
MENTAL DEFICIENCY RATES, U.S., ARMY WORLD WAR
U.S. AVERAGE
10.13
8.94
4.94
15
10
5
0
PER 1000 MEN
■ Local board rejections, white & colored
▨ Diagnosis by camp psychiatrists, white
▨ Diagnosis by camp psychiatrists, colored

FIG. 39. DISTRIBUTION OF ARMY MENTAL DEFICIENCY RATES, BY STATES, FOR WHITES, AND FOR NEGROES, BASED ON LOCAL BOARD REJECTIONS AND DIAGNOSES BY CAMP PSYCHIATRISTS. For sources and data, *see* Appendix N.

high frequencies in Southern states may be due chiefly to the Negro elements in the population. This may be the case in some areas, for example, in the District of Columbia where total rejections for mental deficiency by local boards amount to 7.2 per 1,000, but reports of mental deficiency by camp psychiatrists show only 1.6 per 1,000 white men in contrast to 9.2 per 1,000 Negro forces. This suggestion may also be applicable to the local board data from several of the Southern states. It cannot, of course, be invoked to account for the high rejection rates found in the mountain districts, nor for high rates per 1,000 white men, on the basis of psychiatric examinations. Moreover, it is quite likely that Negroes were subjected to a less severe weeding out process than whites in making up draft quotas from Southern states—in view of the requirement that each rejected individual be replaced by the next man on the list (not necessarily of the same race). Other complications in the interpretation of the army mental deficiency data with regard to Negro forces have already been discussed.

Degrees of mental deficiency reported by the neuropsychiatrists for the total forces are in the proportion: imbeciles, 33 per cent, morons and borderline, 67 per cent.[14] In the case of the white troops, the proportions are, imbeciles, 29 per cent, morons and borderline, 71 per cent. In the case of the Negro troops, the number reported as imbeciles was only slightly less than the number reported as morons or borderline feebleminded. These proportions would seem to indicate that more pronounced indications were required in reporting Negroes for rejection, than in reporting whites.

The lowest frequencies of mental deficiency are found in the newer sections of the country, especially in the Mountain and Pacific states. High incidence, however, is indicated for the white forces from a southern state of the Mountain division, New Mexico. This result may be attributed to the presence of a large proportion of Mexicans and Indians, who are not differentiated from total white forces in the army statistics. Although the incidence of rejections for mental deficiency was generally higher for rural areas than for urban areas, especially in the older Eastern states, extremely low rates for mental deficiency are reported for some of the most sparsely settled rural districts in the West (*see* Table 52).

The analysis of all defects found among rejected and accepted men, by sub-sections, reported by Love and Davenport, show peculiarly high frequency of mental deficiency in several localities. These rates are based on local board data and psychiatric data, combined. The average rate for all rural areas in the United States, 17.59 per 1,000 men, is twice as high as the average rate for cities of 50,000 or more population, 8.71 per 1,000 men

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[14] This distribution may be compared with that reported in the last English survey by the national Mental Deficiency Committee. We cannot be sure that the classes used in these two distributions are comparable, but the total incidence reported by the English committee is lower than rates for American population on the basis of army data. The distribution in England among the three grades of mental defectives, defined as "idiots," "imbeciles," and "feebleminded" (equivalent to "moron" in American usage), reported by the Mental Deficiency Committee, are in the proportions: idiots, 5 per cent; imbeciles, 20 per cent; feebleminded, 75 per cent.

TABLE 52

Rural State Populations with High or Low Ratios of Mental Deficiency Found in Drafted Men (World War) *

A. Rural Populations, by States, from Which *Two per Cent or More* of All Men Subject to Draft Were Reported as Mentally Deficient	Cases of Mental Deficiency per 100 men
Northern New England	
Maine (rural areas)	2.7
Vermont (total population [a])	3.7
East North Central	
Ohio (rural areas)	2.2
Michigan (rural areas)	2.1
Wisconsin (rural areas)	2.0
West North Central	
Missouri (rural areas)	2.3
South Atlantic	
Maryland (rural areas)	3.8
Virginia (rural areas)	2.8
North Carolina (rural areas)	2.8
South Carolina (rural areas)	2.3
South Central	
Kentucky (rural areas)	2.2
Tennessee (rural areas)	2.9
Alabama (rural areas)	2.1
Mississippi (total population [a])	2.3
Louisiana (rural areas)	2.4

B. Rural Populations, by States, from Which *Less than 1.3 per Cent* of All Men Subject to Draft Were Reported as Mentally Deficient	Cases of Mental Deficiency per 100 Men
Middle Atlantic	
New Jersey (rural areas)	1.1
West South Central	
Kansas (rural areas)	1.2
Nebraska (rural areas)	1.2
Mountain	
Montana (rural areas)	0.5
Idaho (total population [a])	0.9
Wyoming (total population [a])	0.5
Colorado (rural areas)	1.1
Arizona (total population [a])	0.3
Utah (rural areas)	0.9
Nevada (rural areas)	0.4
Pacific	
Washington (rural areas)	1.2
California (rural areas)	1.2

* Abstracted from Love and Davenport, 1920, *Defects Found in Drafted Men*, pp. 875–893, 1292–1299.

[a] No separate analysis available for urban and rural areas.

(p. 394). Sub-sections showing a total incidence of mental deficiency above 3 per cent of all recruits examined for military service are given in the following list (*see* Table 53).

The Appalachian districts of Kentucky, North Carolina, South Carolina, Virginia, and Tennessee consistently show corresponding rates of 20 or more cases per 1,000 men examined, i.e., 50 per cent or more above the average for the nation.

TABLE 53

Sections with High Incidence of Mental Deficiency, Local Board Rejections plus Camp Reports, Combined *

Section	Description	Ratio per 1,000 Men Examined
Alabama, Section 4	Negroes, cir. 73 per cent of the total population—Choctaw, Greene, Hale, Pickens, and Sumter Counties	36.24
Maine, Section 2	Coast region, native whites of native parentage—Hancock, Knox, Lincoln, Sagadahoc, and Waldo Counties	36.53
Maryland, Section 2	Peninsula area—Caroline, Dorchester, Kent, Queen Anne's, Somerset, Talbot, Wicomico, and Worcester Counties	44.11
Maryland, Section 3	Rural—Allegany, Anne Arundel, Carroll, Cecil, Frederick, Garrett, Harford, Howard, Montgomery, Prince George's, and Washington Counties	33.50
North Carolina, Section 1	Mountain whites, 24 counties	30.77
North Carolina, Section 6	Southeast portion of state—Bladen, Brunswick, Columbus, Duplin, New Hanover, and Bender Counties	37.79
Vermont (state not divided)		37.42
Virginia, Section 3	Central Virginia, 24 upland counties, not mountain districts	33.62

* Data from Love and Davenport, 1920, *Defects Found in Drafted Men*, pp. 1394ff., pp. 218ff.

Wide variations in the frequency of apparent mental deficiency in different localities are indicated in various surveys made under the auspices of, or in coöperation with, the National Committee for Mental Hygiene. However, since different standards were used, it is impossible to make exact comparisons on the basis of results obtained by different investigators. Variations in the frequency of mental deficiency in various counties of Indiana, as reported by Estabrook, 1922, on behalf of *Indiana Committee on Mental Defectives*, run as follows (p. 14):

Designation of County	Estimated Percentage of Feebleminded
A	1.34
B	.82
C	2.01
D	2.06
E	1.86
F	1.41
G	2.38
H	2.14
I	1.59
J	1.33
K	2.75

County "K" is on the Southern border. It has shown a decrease in population of about 30 per cent in the last fifty years.

Comparative data for several different groups are reported for two counties in Illinois in a United States Public Health Survey, 1929. This study was carried out primarily in order to investigate the relationship between intelligence and physical development.

> "This study is based on results of a joint investigation made by the United States Public Health Service and the Illinois State Department of Public Welfare . . . Approximately 5,000 children were examined both physically and mentally. These examinations were made in X County, Illinois, situated in the extreme southern part of the State bordering on the Mississippi River, and in A County, Illinois, situated in the northern part of the State, west of Chicago. All of the physical examinations were made by medical officers of the United States Public Health Service. The mental examinations were made by psychologists and other trained personnel of the Illinois State Institute for Juvenile Research . . .
>
> "Urban (in this report) means towns of 2,500 or more population in 1920, except that five towns in the Northern county with a population under 2,500 in 1920 were considered urban because at the time of the survey (1924–25) more or less urban conditions prevailed there" (pp. 2, 9).

Unfortunately, a group analysis of mental deficiency on the basis of Stanford-Binet tests (used in this survey with all children rating below 70 I.Q. on the group tests) is not available. It is probable, however, that these results would vary in accordance with the variations in low group intelligence quotients shown in the following table.

TABLE 54

Otis Primary Group Test Ratings of School Children, Aged 6–9 Years, in Two Counties in Illinois *

	County A		County X			
	Urban White	*Rural White*	*Urban White*	*Rural White*	*Urban Negro*	*Rural Negro*
Median Intelligence Quotient	104.3	96.0	101.9	88.7	84.5	86.3
Per Cent under 80	2.1	11.1	3.1	22.1	34.6	28.6
Number Tested	1,744	298	129	172	55	35

* From Kempf and Collins, 1929, "A Study of the Relation between Mental and Physical Status of Children in Two Counties of Illinois," *Public Health Reports*, Vol. 44, pp. 9, 15.

We are warranted in making the general statement that rural areas in the Eastern United States characterized by poor lands and long continued out-migrations show high frequencies of apparent mental deficiency. On the other hand, very low incidence of mental deficiency is found in some of the newer agricultural areas of the West, although these areas may be even more sparsely settled, and the people may be quite as isolated from urban contacts. We will, however, defer any attempt to give a causal interpretation of these results to a later chapter (Chapter X).

6. *Conclusions*

Studies of racial groups indicate a wide difference in the cultural-intellectual development of the different races now in this country. These differences are in every case associated with variations in occupational status and in regional location. So long as racial differences are directly associated with regional and occupational differences, it is unsound to deduce from these studies that race is a cause of group differences in intelligence—unless the other variables have been well controlled. Some studies show that rural immigrants from South Italy, Mexicans, and others, have not responded to an improvement in their environment as quickly as other immigrant groups. This tendency might be accounted for by the cultural lag carried from their previous surroundings; but, whatever may be the cause, the social consequences are important. However, since racial differences in cultural-intellectual development merge with differences between regional and occupational groups, these functional groupings appear to us to be rather the more interesting and socially significant—except in so far as socially important differences between races may be shown truly to have a biological basis. Critical discussion of causal factors affecting group differences in intelligence will be reserved for a later chapter.

Cultural-intellectual levels vary greatly among different regional groups. These differences are frequently associated with a contrast between rural and urban environments. Large differences, however, are also found between different rural areas, as between the rural South and the rural Northwest. But such differences in turn are associated with variations in economic levels of living, education, and other social factors. The problem of unravelling the causal relations in a complex of associated variables is a very baffling one.

Whatever may be the proper causal interpretation of their situation, scattered rural communities on poor "marginal" lands, with low standards of living, low levels of cultural-intellectual development, and high frequencies of apparent mental deficiency, present problems which call for most careful attention.

CHAPTER VIII

VARIATIONS IN CULTURAL-INTELLECTUAL DEVELOPMENT AMONG GROUPS CLASSIFIED BY OCCUPATION OR SOCIAL STATUS

Intelligence test scores made by adults in different occupations and by children classified according to the occupations of their fathers give by far the most extensive data on the subject of variations in cultural-intellectual levels among social groups. Figures on intelligence ratings in relation to income will be given in a later section of this chapter. However, as suggested by Sydenstricker, "It is possible that the general type of occupation differentiates the population according to *mores* and culture to a greater extent than economic status does in spite of the claims that are made for wealth as a determinant of social class" (1933, p. 136). In the American situation differences in the average intellectual development of members of different occupational classes have often been recorded, although there is always much overlapping in intelligence to be found between members of these groups. American society has been sufficiently mobile for occupational classification to be in part truly functional, as well as in part traditional and fortuitous.

The broad outlines of the divergencies in central tendency and the overlapping between occupational groups were shown in the army intelligence examination data. These data have been so frequently discussed that it is hardly necessary to describe them again in this context. Moreover, these data have several serious imperfections. Occupational groups were selectively drafted in different ways. For example, many established farmers were kept at home, although most of the floating agricultural laborers were accepted. There is no control of regional variations in the army data for occupational groups. For example, agricultural workers and miners, drawn in large part from isolated communities, are compared with skilled industrial workers, drawn from very different environments. This factor probably exercised a much greater influence on the low scores found for farmers than the first factor, since the younger sons of the farm families were commonly accepted while the older members of the same families were kept in the fields. Occupations were often inaccurately stated by draftees, with a view to desirable army appointments. For example, college students may appear as clerks, unskilled laborers as cooks, and garage hands as mechanics. Finally, the group verbal tests, on which the occupational ratings are chiefly dependent, give great advantage to persons accustomed to paper and pencil performance.

Scholastic success and the kind of intellectual development measured by intelligence tests probably operate most powerfully as selective processes with reference to the clerical and professional groups. Other personal and social factors appear to exercise greater influence on occupational placement both in the crafts and in business administration, although large differences in intellectual development appear consistently between the craft group as a whole and the business administration group as a whole. One must bear in mind, in this connection, that tests for adults, especially at the higher intelligence levels, are much less satisfactory, at present, than the tests that have been devised for use with children. But we are not concerned here with the detailed study of the relation of scholastic aptitude or test intelligence to occupational location [1]—but rather with the general distribution of intellectual development in broad occupational groups and with the significance of such distribution for population trends.

A new difficulty intervenes at this point, if variations in intellectual development are to be considered with reference to population tendencies. We have no a priori assurance that the differences observed between adults in different groups will appear in their children, especially when these children are subjected to the influence of standardized educational processes. We can, however, overcome this difficulty by confining our attention to studies of the distribution of cultural-intellectual development among children derived from different social groups. We shall, therefore, for the most part center our attention in this chapter on variations in cultural-intellectual development among children of grade school age, classified according to the occupation of the father, or other indices of the social status of the parents. It is hardly necessary to remind the reader again that in this part of our study we are dealing wholly with present developmental levels, affected both by hereditary and by traditional backgrounds.

1. *Intellectual Development of School Children Derived from Different Occupational Classes*

Studies reviewed by Schwesinger have shown that the intelligence quotients of individual children remain quite constant during the whole public school period. The comparative ratings of children from different social classes in the primary grades are also found in about the same relations when seventh and eighth grade children are compared—except when we are dealing with extreme variations in environment, such as rural isolation or racial segregation. A change in the relative distribution of intelligence ratings often appears in high school groups, as compared with groups of elementary school children, but this difference can usually be attributed to selective factors, because all social classes are not equally represented in high school populations. Minor variations at different age levels also result from imperfections in the standardization of different tests.

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[1] On this topic the reader may consult Pintner, 1931, and standard texts and periodicals on personnel research and industrial psychology.

The three largest surveys that have been made in this country of the intelligence of elementary school children classified according to the occupation of the father are: the Madison (Wisconsin) survey by Dexter, the Ohio city [2] survey by Collins, and the New York village survey by Haggerty and Nash. These three studies were reported at about the same time, 1922–1923. The tests used in all these studies were reliable group tests.[3] It should be noted, however, that intelligence quotients derived from these tests are not exactly comparable.[4] Also the composition of the occupational classes is not exactly the same in the different series. But the differences in central tendency between broad occupational groups are strikingly similar in the three series (*see* Table 55, *see also* Figures 40 and 41).

TABLE 55

AVERAGE INTELLIGENCE QUOTIENTS OF ELEMENTARY PUBLIC SCHOOL CHILDREN IN THREE LOCALITIES, CLASSIFIED ACCORDING TO FATHERS' OCCUPATIONS

Main Occupational Groups	Madison, 2,782 Children, Grades II–III (Dearborn A) Grades IV–VIII (N.I.T.) by Dexter Mean I.Q.	Ohio City, 4,727 Children, Grades I–IV (Otis Primary) Grades V–VI (Otis Advanced) by Collins Mean I.Q.	New York Villages, 6,688 Children, Grades III–VIII (Haggerty, Delta 2) by Haggerty and Nash Median I.Q.
Professional	115	115	116
Business, clerical	105 [a]	110 [b]	107
Skilled and semi-skilled wage earner	95 [c]	102	97 [d]
Farmer	— [e]	— [e]	94
Unskilled wage earner	89	94	91

[a] Business and clerical, and foreman combined, omitting farmers.
[b] Managerial, clerical, trade and foreman, combined.
[c] Skilled and semi-skilled combined, omitting foreman.
[d] Weighted average of medians of skilled and semi-skilled.
[e] Less than 100 cases.

The high average intellectual development of children derived from professional and upper commercial groups, indicated by the data presented above, may be checked by noting the average intelligence quotients in private school populations, recruited largely from these classes. Dearborn and Cattell, 1930, report median I.Q.'s of 12 private school groups, comprising 1,295 pupils. The Stanford-Binet was used in some schools, the Dearborn

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[2] "A city of 45,000 population."

[3] Dexter tested 2,782 children, using the Dearborn General Examination C with Grades II–III, and the National Intelligence Test with Grades IV–VIII. Collins tested 4,727 children, using the Otis Primary Group Test with Grades I–IV, and the Otis Advanced Group Test with Grades V–VI. Haggerty and Nash tested 6,688 children in Grades III–VIII in New York villages of less than 4,500 inhabitants, using the Haggerty Intelligence Examination, Delta 2.

[4] *See* Commins, 1928, Cattell, 1930, and others.

Group Tests in others. The range of median I.Q.'s for these 12 schools is 109 to 128. In general the average scores for intellectual development of children derived from the families of small business administrators, office workers, tradesmen, and skilled workers are scattered between the level of the professional and upper commercial group, on the one hand, and that of the unskilled labor group, on the other hand—more or less in relation to the degrees of intellectual development required for success in different occupations.

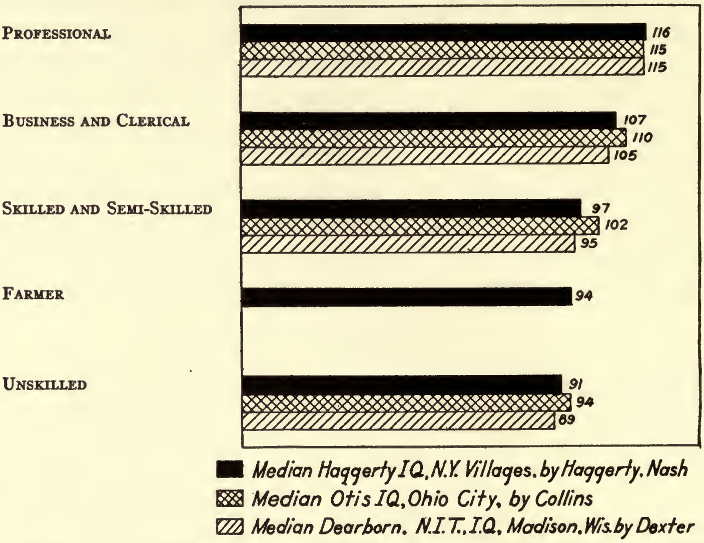

FIG. 40. MEDIAN INTELLIGENCE QUOTIENTS OF ELEMENTARY PUBLIC SCHOOL CHILDREN IN THREE LOCALITIES, GROUPED BY FATHERS' OCCUPATIONS.

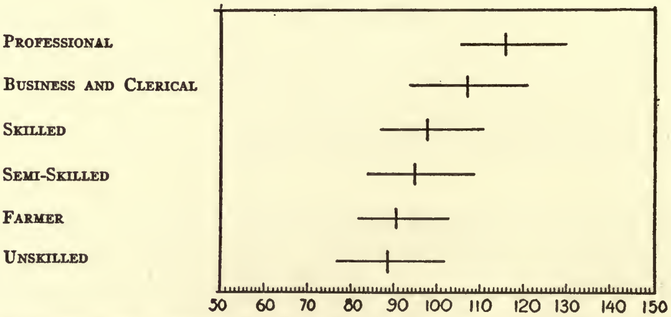

FIG. 41. HAGGERTY INTELLIGENCE QUOTIENTS OF PUPILS IN NEW YORK STATE RURAL SCHOOLS, GROUPED BY FATHERS' OCCUPATIONS. Bar represents interquartile range (range of middle 50 per cent); median is shown by crossline.

There is about 25 per cent overlapping in intellectual development between the children of professional workers and the children of unskilled workers as shown by the quartile values reported both by Collins and by

Haggerty and Nash. In Collins' distribution of "family intelligence quotients" (average of all intelligence quotients for children from each family), the upper quartile (75 percentile) of the families of unskilled workers is located at the same point (I.Q. 108 points) as the lower quartile (25 percentile) of the professional class families. In the Haggerty and Nash (New York village) series, the upper quartile for the children of unskilled workers (102 points) and the upper quartile for the children of farmers (103 points) fell slightly below the lower quartile for the children of professional workers (105 points).[5] This represents somewhat more overlapping between children derived from different occupational groups than appeared in the army data between adults classified according to occupation, where the upper quartile of the laborers was only equal to the lower quartile of the clerical groups and considerably below that of the professional groups. In the case of the intermediate occupational classes, "the butcher, the baker, the candlestick maker," the bourgeoisie and skilled labor groups, who make up a large proportion of the general population, the overlapping between the children of fathers in different occupational levels is very great (*see* Appendix P).

TABLE 56

PERCENTAGE DISTRIBUTION BY HAGGERTY INTELLIGENCE QUOTIENTS OF NEW YORK VILLAGE PUBLIC SCHOOL CHILDREN, GRADES III–VIII, CLASSIFIED ACCORDING TO FATHER'S OCCUPATION *

Haggerty Intelligence Quotients	Unskilled	Farmer	Semi-Skilled	Skilled	Business-Clerical	Professional
140 and up	.40	.87	1.15	1.94	3.04 [a]	11.75
130–139	1.07	1.61	2.67	3.50	6.78	14.04
120–129	3.22	4.04	4.20	7.59	17.19	17.48
110–119	9.66	9.36	10.31	13.71	17.16	20.63
100–109	12.35	15.88	20.80	19.74	19.92	19.19
90–99	20.81	23.33	22.90	23.63	17.16	10.88
80–89	19.86	22.56	20.33 [b]	17.41	11.55	5.44
70–79	18.66	14.72	12.59	8.27	5.08	.57
60–69	10.34	6.00	4.19	3.59	2.01	.00
50–59	3.36	1.93	.95	.58	.01	.00
Total	99.73	100.30	100.09	99.96	99.90	99.98

* From Haggerty and Nash, 1924, "Mental Capacity of Children and Paternal Occupation," *Journal of Educational Psychology*, Vol. 15, p. 572.

[a] The figure 6.04 in the original text was corrected by checking totals, on assumption of normal distribution in each sample. Correction confirmed by author in letter.

[b] A hypothetical correction from 22.33 in original text, on same basis as previous correction. This error, however, was not noted until after the estimates reported in Chapter IX had been made. Correction for this error would have slightly increased the index of the influence of differential fertility on cultural levels, but hardly to an appreciable degree.

The most satisfactory method of comparing cultural-intellectual development in various groups is effected by comparing proportional frequencies at different I.Q. levels. In this way the whole range of variations in each group is taken properly into account. This approach, incidentally, eliminates the disturbance of discrepancies in the standardization of various tests. For example, a Haggerty intelligence quotient of 140 points is about equal to a Stanford-Binet intelligence quotient of 130 points; but this fact does not affect the relative frequency with which individuals from different groups appear in the top level for the same test. We may assume that there would only have been about 12 per cent of the professional family children with Binet I.Q.'s as high as 130 and up, but on the same assumption only about 2 per cent of the children from families of skilled workers would have received this rating.

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[5] It may be noted that degree of overlapping, measured in this way, is free from any disturbance due to imperfections of standardization.

The presence of a considerable proportion of children of foreign parentage in the unskilled workers' group complicates the situation in two ways. It probably introduces a larger proportion of children of superior native intelligence, due to the handicaps in occupational locations experienced by immigrants, than would otherwise be found in this class.[6] On the other hand, many of the children of immigrants are themselves handicapped in intelligence test performance by foreign-language training in the home and other cultural conditions. These complications are eliminated in the data supplied in one of the studies in a Harvard Series, reported by Stoke, 1927. This study is limited to public school children, Grade I, of North European origin and, with 12 exceptions, to the children of parents born in the United States or other English-speaking countries. Anthropometric and health data are also included.

> "For the purposes involved here, a group of about 500 children were needed. Actually, 508 were used. Even with this large number the extreme occupational groups contained few cases—19 in Group I and 25 in Group V. The children in the study live in a suburb of Boston and are part of a larger group being studied by the Psycho-Educational Clinic of the Graduate School of Education, Harvard University. The data included have been collected by the Clinic during a period of three years—1922, 1923, and 1924—and by the writer during 1924 and 1925" (p. 7).
>
> "Most of the children have had three tests—one with the *Stanford Revision of the Binet Scale* and the others with the *Dearborn Series I A Group Test.* A number of the children have had two individual tests in addition to the group tests" (p. 13).

The Taussig scheme of occupational classification is followed. In this scheme Group I is the class of lowest social status, and Group V is the class of highest. Some of the most significant results of this study are shown here in Table 57.

The differences in intellectual development between professional and unskilled workers' families appear to be heightened in this sample in comparison with the differences found between these classes in the more heterogeneous samples already described, but the numbers are too small to give weight to this result. It is interesting to note that the distribution of

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[6] *See* discussion of Kawin's findings, Chapter X, below.

TABLE 57

Percentage Distribution by Intelligence Quotient Levels of Public School Children, Grade I, Classified According to Father's Occupation *

I.Q. Groups (Adapted from Terman)	Occupational Groups (Taussig)				
	I (*Unskilled Workers, 19 Cases*)	*II* (*Semi-Skilled, 110 Cases*)	*III* (*Skilled Workers, 159 Cases*)	*IV* (*Business and Clerical, 195 Cases*)	*V* (*Professional Workers, 25 Cases*)
Very superior	0.0	2.7	5.0	6.1	28.0
Superior	0.0	8.2	14.5	16.9	32.0
Average	57.9	55.5	62.9	66.7	36.0
Dull	26.3	28.1	13.8	7.2	4.0
Borderline or defective	15.8	5.5	3.8	3.1	0.0
Total	100.0	100.0	100.0	100.0	100.0

* From Stoke, 1927, *Occupational Groups and Child Development*, pp. 15, 16.

test intelligence in the skilled worker class in this series differs a good deal from that in the semi-skilled group—with nearly twice as many very superior and superior individuals, and only half as many dull and defective, combined; but the skilled worker group differs very little from the business and clerical group.

Stoke reports, as the mean square contingency coefficient between occupational status of fathers and intelligence of children, $C = .357$, for the sample described above (p. 20). Chapman and Wiggins report a Pearson product moment correlation coefficient of similar value, .31 ± .024, between social status and intelligence, with the influence of foreign-language factor eliminated, in a New England manufacturing town, Meriden, Connecticut. This value is derived from National Intelligence Test scores of public school children, Grades VI–VIII, and ratings on the Chapman-Sims Socio-Economic Scale. Chauncey, studying junior high school pupils in Stillwater, Oklahoma, reports lower coefficients of correlation (Pearson) between intelligence as measured by the McCall Multi-Mental Scale and socio-economic status as rated on the Sims Score Card ($r = .206$, Grade VIII, 113 pupils; $r = .191$, Grade IX, 130 pupils). Corresponding values of .300 and .353 are reported between Stanford Achievement scores and socio-economic status for a Minnesota sample, described as "a fair cross-section of American homes" (Goodenough, 1927). Studies on ratings of infants and nursery school children will be discussed briefly in dealing with the causal interpretation of the variations described here (*see* Chapter X).

When the children of the professional and higher administrative group are compared with the children of unskilled workers, the difference in central tendency commonly amounts to 20 points, more or less, on an intelligence quotient scale. Between these groups we find an overlapping of about 25 per cent, i.e., the top 25 per cent or so of the children of unskilled workers have intelligence quotients as high as or higher than the child from the professional group who stands at the 25 percentile (half-way between the middle and the bottom of his own class) in comparisons between children living in the same urban communities and attending the same schools.

When children derived from the intermediate social classes are compared, the differences in central tendency are much smaller, and the overlapping much greater. The difference in distribution of intellectual development between children of the "petty bourgeoisie" and children of skilled manual workers is very slight.

In general it may be said that there is a significant correlation between the intellectual development of children and the socio-economic status of their parents. The strength of this relationship may be represented by a Pearson coefficient of correlation in the vicinity of .3. The coefficients actually obtained vary, of course, in different localities and with different measures of intelligence and social status, none of which is wholly satisfactory.

Any adequate statement of the distribution of intellectual development among children derived from different social classes must take account of the variations within each class as well as differences in central tendency between classes.

2. *Frequency of Extreme Variations in Intellectual Development in Different Social Groups*

We have already observed that small differences between groups in central tendency in intelligence test scores are normally associated with much larger differences in the frequencies of very superior and very inferior individuals.

In studying the frequency of gifted children from different social classes, we may again turn to Terman's report on *Mental and Physical Traits of One Thousand Gifted Children,* as affording the most extensive data on the subject. The children in the main experimental group in this study were selected on the basis of intelligence tests administered to a larger group of bright children, recommended by teachers in the elementary schools in certain areas in the vicinity of Los Angeles and San Francisco. The criterion of selection was an intelligence quotient of 140—when corrected to allow for unequal standardization at different ages. Data regarding occupation of fathers were collected in the course of this study. Spaces were provided in a Home Blank for reporting "father's main occupation at successive ages," including age when each occupation that had been followed was begun, and the number of years it was followed. The replies were sufficiently definite for 560 fathers in the main group to permit of classification of occupation. It would seem likely that less honorific occupations would be omitted or inaccurately reported more frequently than more honorific ones, so that some bias may affect this distribution. The method of classification employed is taken from United States Census procedure: professional, commercial, industrial, and public service, with sub-groups under each. The results are as follows for the "main occupation" of fathers at the time the report was made (pp. 62, 63):

All Occupations			Number
Professional Group:			560
Lawyers		33	
Engineers (with college degrees)		28	
Teachers (total 30)		30	
In colleges and universities	10		
High school	13		
Elementary	3		
Unclassified	4		
Physicians and surgeons		23	
Clergymen		15	
Writers		9	
Dentists		9	
Musicians		6	
Architects		3	
Inventors		2	
Other professions		5	
Total professional			163
Proportion of all fathers			29.1 per cent of total
Commercial Group:			
Executives and managers		92	
Salesmen and insurance agents		43	
Retail dealers (small stores)		38	
Clerical workers		38	
Wholesale dealers, brokers, and owners of large retail establishments		19	
Manufacturers		11	
Druggists		8	
Editors and publishers		5	
Expert accountants		5	
Total commercial			259
Proportion of all fathers			46.2 per cent of total
Industrial Group:			
Carpenters		16	
Mechanics and machinists		14	
Tailors		7	
Painters		6	
Contractors		5	
Barbers		5	
Florists		4	
Telegraph operators		3	
Butchers		3	
Photographers		2	
Farmers		2	
Lithographers		1	
Foreman		1	
Pattern maker		1	
Landscape gardener		1	
Sea captain		1	
Baker		1	
Potter		1	
Cobbler		1	
Practically unskilled, including such occupations as teamster, expressman, waiter (1), day laborer (1), etc.		38	
Total industrial			113
Proportion of all fathers			20.2 per cent of total

All Occupations	Number	
Public Service Group:		
Postmen and postoffice clerks	8	
City firemen	4	
Army and Navy officers	3	
Soldiers and sailors	3	
Mayors	2	
Other city officials	3	
Policemen	1	
Civil service clerks	1	
Total public service		25
Proportion of all fathers		4.5 per cent of total

The conspicuous feature of this occupational classification is the great preponderance of children from the families of executives and professional workers. The proportional frequency of professional workers in this sample is ten times that observed in the total population of Los Angeles and San Francisco, on the basis of census data for 1910, presented by the authors. This comparison by industry groups runs as follows:

	Fathers of Gifted Children	Population of Los Angeles and San Francisco, 1910
	Per Cent	*Per Cent*
Professional group	29.1	2.9
Public service group	4.5	3.3
Commercial group	46.2	36.1
Industrial group	20.2	57.7

A theoretical scale (the Barr scale) representing successive grades of intelligence presumably demanded by different occupations was constructed by Terman and associates on the basis of estimates made by 20 judges. The scale is constructed in P.E. units ranging from "hobo" and "odd jobs" (0.00 units, 1.54 units, respectively) through day laborer (3.62), teamster (5.41), bricklayer (7.77), telegraph operator (10.11), mechanical repairman (10.26), small manufacturer (13.31), dentist (13.54), architect (16.28), and so forth to "inventive genius," (20.71)—to mention only a few occupations as samples. Some features of the arrangement are slightly amusing, for example, the juxtaposition of "University professor (has A.M. or Ph.D., writes, teaches, and does research)," "Great merchant (owns and operates a million dollar business)," and "Musician (Paderewski)," rated as 17.81, 18.06, and 18.14; but on the whole, the list probably corresponds roughly to real differences—except that it apparently exaggerates degrees of difference, as shown by comparing population ratings on this scale with actual test results. On the basis of this theoretical scale, the gainfully occupied population of Los Angeles and San Francisco, combined, is assigned a mean rating of 8.88 (S.D., 3.24) or 7.92 (S.D., 3.38), using two different methods of classification, whereas the fathers of the 560 gifted children for whom data were available receive a mean rating of 12.77 (and, in spite of the higher average, a lower standard deviation, 2.78).

> "The mean of 12.77 for total fathers of gifted corresponds fairly closely to the Barr rating of a stenographer, librarian in a small city, or primary teacher. The mean of 7.92 for the general population corresponds to the Barr rating of a plasterer, baker, or metal finisher" (p. 71).

The proportion in the total population with ratings below 6 units on the Barr scale (i.e., the unskilled labor group) varies from 27 per cent to 43 per cent according to the method used in distributing persons reported with "no occupation" in the census statistics. Among the 560 fathers of gifted children, only 7 are reported as belonging in this group, or 1.3 per cent—but the possibility that occupations of this type were not reported with equal readiness must be kept in mind. At the other extreme, an occupational rating of 15 points or more on the Barr scale appears more than 10 times as frequently among the fathers of the "gifted children" as in the general population.

The distribution by income groups does not yield such striking results. The data on income are available only for a random ("not selected") sample of 170 families of gifted children, visited by a research worker in order to obtain this information—since questionnaire data on income under these circumstances would be impossible to obtain or unreliable.

The present writers have estimated the proportional frequency of families reporting "gross income" at several levels for the total population of Los Angeles and San Francisco in 1924, the year in which the supplementary data in question were collected, on the basis of income tax returns. The proportions of all returns filed by families (husband and wife jointly, man head, and woman head) at different income levels for the total United States are applied to the number of returns in different income classes from Los Angeles and San Francisco, combined. The number of families is estimated by working back from the number of families of two persons or more reported in 1930, on the assumption of a constant yearly rate of increase during the previous decade, proportional to the increase in the total population of these two cities. The true proportions of families at each income level would have been somewhat higher, because income reported by wives separately (amounting to about 4 per cent of all income reported), and income from non-taxable sources are excluded from the estimates reported below. A more serious difficulty is that it is impossible to gauge accurately the lower level of the group reporting incomes less than $5,000 because of the absence of legal compulsion in the case of net incomes less than $2,000, after allowance for deductions.[7] There are, of course, also the uncertain

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[7] The actual number of gross returns under $5,000, husbands and wives jointly, total United States, are distributed as follows:

Under $2,000	16 per cent
$2,000–$3,000	43
$3,000–$4,000	27
$4,000–$5,000	13
Total under $5,000	100 per cent

factors of tax evasion and irregularities due to small size of the sample for families of gifted children.

TABLE 58

ESTIMATED NUMBERS OF FAMILIES WITH SPECIFIED "GROSS INCOME" AND PERCENTAGES OF ALL FAMILIES AT OR ABOVE EACH INCOME LEVEL, IN LOS ANGELES AND SAN FRANCISCO, COMBINED, 1924

Income Classes (Gross Income Minus Income from Tax-Exempt Sources or Reported Separately by Wife	Absolute Numbers of Tax Reports in Each Class	Estimated Number of *Families* in Each Class [a]	Estimated per Cent of Total Population
$10,000 and up	13,068	9,683	2
$5,000 to $10,000	19,497	15,987	4
Under $5,000 reported	261,382	156,306	35
No income tax returns	—	268,024	60
Estimated number of families (2 persons or more) in total population [b]		450,000	100

[a] On basis of proportions of "family returns" (husband and wife jointly, male head, female head) at each income level for total United States, 1924 (.741, $10,000 and over; .820, $5,000 to $10,000; .598, under $5,000).

[b] Total families of 2 persons or more in 1930 (559,799) divided by 1.245 to give value for 1924, assuming constant rate of increase per year in proportion to growth of total population of these cities, 1920–1930.

TABLE 59

INCOMES REPORTED BY 170 FAMILIES OF GIFTED CHILDREN, STUDIED BY TERMAN, AND PERCENTAGES OF TOTAL SAMPLE AT OR ABOVE EACH INCOME LEVEL

Incomes	Number of Families	Per Cent of All Families in Sample	Per Cent of Expected Quota
$10,500 to $25,000	14	8	400
5,500 to 10,500	32	19	475
2,500 to 5,500	64	38	109
Under $2,500	60	35	58
Total	170	100	100

We observe that only 35 per cent of the families in this sample having children with intelligence quotients above 140 points have annual incomes less than $2,500, whereas we estimate that about 60 per cent of all families in this area have incomes below this figure. On the other hand, we find that 27 per cent of the families in this sample report incomes of $5,000 or more, whereas only about 6 per cent of all families, according to our estimates, reported "gross incomes" of $5,000 or more.[8] These results, therefore, suggest that very superior intellectual development appears somewhat more frequently among families with more than $5,000 income per year than among families with small incomes.

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[8] The absence in this sample of families with annual incomes above $25,000 cannot be held significant, because private schools were not canvassed in this study.

The occupational groups with superior social status have in the past made much greater contribution, in proportion to their numbers, to the business and professional leadership of the nation. This is shown by Visher's analysis of the social origins of persons cited in *Who's Who in America*, predominantly a professional group, and by Taussig and Joslyn in their study of American business leaders (*see* Table 60).

TABLE 60

DISTRIBUTION, BY OCCUPATION OF FATHER, OF 18,356 PERSONS LISTED IN "WHO'S WHO IN AMERICA" AND OF 8,398 AMERICAN BUSINESS LEADERS *

Occupation of Father	Per 100 Persons in Sample		Number in Sample per 10,000 Married Males in Specified Occupational Class in 1880 [a]	
	Persons in "Who's Who in America 1922–1923"	*American Business Leaders*	*Persons in "Who's Who in America 1922–1923"*	*American Business Leaders*
Laborer	6.7	12.5	3.3	2.7
Farmer	23.4	12.4	18.1	4.4
Business man	35.3	60.0	87.7	68.3
Professional man	34.3	13.4	278.8	49.8
Other	0.3	1.7	—	—

* Adapted from Taussig and Joslyn, 1932, *American Business Leaders*, pp. 122, 125.

[a] Excepting the farmer class, for which the rate is taken as of the year 1870.

Taussig and Joslyn attempt to estimate the importance of heredity in the development of business leaders. Their inferences are subject to the ambiguity which affects materials in which no exact control of the major variables is possible. But, whatever may be the proper causal interpretation of this relationship, their findings clearly show that groups with superior social status are proportionately much more productive of eminent professional and business leaders than are the groups with inferior social status. On the other hand, the extent to which poor boys of obscure parents may rise to eminence in this country has been sufficiently advertised to need no reiteration here.

At the other extreme of the scale of intellectual development, *mentally defective* children are found scattered through all social classes, but with higher frequency in certain groups. Popenoe, 1928, concludes, "The mental defectives do come from all classes in the community; and the bulk of them come from the 'middle' classes, not from the slums" (p. 309).[9] This conclusion is based primarily on an investigation of the occupations of the fathers of 605 patients in the Somona State Home for the Feebleminded (California). It appears that 63 per cent of the patients investigated were derived from the families of skilled or semi-skilled manual workers, which is just about the proportion expected on the basis of the distribution by occupation of all adult workers in California in 1920. However, 24 per cent of the patients came from the families of "common laborers," in contrast to about 8 per cent for all occupied males; and only 10 per cent of the patients came from the "lower business group," in contrast to 19 per cent for the general population; and only 3 per cent from the semi-professional, professional, and upper business group, in contrast to 8 per cent for the general population. A somewhat more extensive investigation of the same sort has been reported for the fathers of individuals admitted to or on the waiting list of the Minnesota School for Feebleminded at Faribault, Minnesota, compared with a random sample of 866 adult males in the Minneapolis City Directory. The results of this investigation are given in Table 61. One must, of course, always bear in mind that the interpretation of statistics based on an analysis of institutional cases is always hampered by the possible influence of factors which may lead to spurious results, such as a tendency for children of the same degree of mental defect to be more frequently institutionalized if found among families in some situations than if found among other families.

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[9] Popenoe, in the article, develops the principle that "sterilization must be applied to individuals because of their individual characteristics and inheritance, rather than because of their inclusion in some particular socio-economic group" (p. 314). No reasonable person would disagree with this proposition. But many may entertain doubts about the degree to which sterilization of obvious defectives will affect the genetic characteristics of the general population or the incidence of mental deficiency. And variations in the incidence of mental deficiency in different groups may carry important implications for population policy relating to the indirect influence of social conditions on differential reproduction rates.

TABLE 61

Classification of Occupations of Fathers of the Feebleminded and of a Random Sample of Male Adults in Minneapolis, Minnesota *

Occupational Category [a]	Occupations of Fathers of 823 Patients Admitted. Per Cent	Occupations of Fathers of 516 Individuals on Waiting List. Per Cent	Occupations of Males in Random Sample. Per Cent
(I) High professional and major executives	0.4	0.6	3.0
(II) Lower professional and business men	4.1	1.2	8.0
(III) Technical, clerical, and minor executives	8.1	7.5	30.0
(IV) Skilled trades and lower clerical	31.5	33.0	27.0
(V) Semi-skilled occupations	17.0	20.5	27.0
(VI) Unskilled occupations	38.9	37.2	5.0
Total	100.0	100.0	100.0

* From Paterson and Rundquist, 1933, "The Occupational Background of Feeblemindedness," *American Journal of Psychology*, Vol. 45, pp. 118–125.

[a] Based on Minnesota Rating Scale for Occupational Intelligence.

One interesting result of the Minnesota investigation deserves special emphasis. About 75 per cent of the institutionalized high grade defectives (with I.Q.'s above 60), but only 42 per cent of those who were classified as being "imbeciles" and only 36 per cent of those classified as "idiots" were derived from the semi-skilled and unskilled occupational groups. Conversely, the percentage of all the idiots and imbeciles coming from the three upper occupational groups (12 to 20 per cent, according to various classifications) was twice as high as the percentage of all the high-grade feebleminded children in this institution who were drawn from these groups. This result might be influenced by selective factors affecting the placement of children in institutions. But the same phenomenon is clearly apparent in the community surveys where the possible influence of these factors is greatly reduced. According to the report of the Mental Deficiency Committee (Great Britain) based on extensive community surveys in 1925–1927, 25 per cent of high-grade "feebleminded" children (2,091) were derived from homes classified as "very poor"; but only 15 per cent of the 419 imbecile children and only 5 of the 94 idiot children came from homes so classified (pp. 191, 203). Conversely, only 1.2 per cent of the "feebleminded" children, but 6 per cent of the imbeciles and 9.5 per cent of the idiot children were found in homes described as "superior" in economic status. Thus, there seems to be some concentration of high-grade mental defectives in certain groups, whereas extreme idiocy is more sporadic in its incidence. This relationship is shown even more strikingly in the results of a recent investigation in Denmark, where only 22 per cent of the parents of extremely defective children (idiots, mostly) were found in the class "Laborers and servants," although 76 per cent of the parents of the children in a school for high-grade feebleminded children were so classified (*see* Wildenskov, p. 61). In this study definite evidence is also introduced to show that the difference in social backgrounds thus indicated is a true difference, not much affected by selective factors affecting institutional placement. This greater frequency of high-grade mental defectives, morons, and borderline cases among families with low social status might be given either an environmental or a hereditary interpretation; but this important problem must be held in abeyance until we have introduced materials which bear more directly on it.

Social workers generally recognize that mental deficiency is an important contributory cause of dependency, although, of course, many families become dependent, even in normal times, due to circumstances which have no association with mental defect. The White House Conference on Child Health and Protection, Committee on Physically and Mentally Handicapped, in the report on *The Handicapped Child*, stated that in a survey of homes for dependent children in sixteen states, 16 per cent of the children in these homes were classified as feebleminded (p. 343). The Conference Committee also cites the results of an investigation of dependent families in New York City in the pre-depression period, showing that 12 to 15 per cent of the individuals concerned were diagnosed as feebleminded, with the further comment that "the addition of undiagnosed but suspected cases, some of which may be intellectually sub-normal rather than feebleminded, would raise the figure to more than 25 per cent" (p. 344). On the basis of such findings, the Conference Committee estimates that mental deficiency must be at least twice as frequent in dependent families as in the general population. A study by Davis, 1930, may be cited as representative of studies of children in orphanages. He compares the distribution of intelligence ratings for 1,051 white children in Texas orphanages with corresponding ratings for 504 white public school children of similar ages—using Dearborn and Haggerty examinations. Among the orphanage children 15 per cent (Dearborn scores), or 17 per cent (Haggerty scores), have intelligence quotients below 70—in contrast to 4.4 per cent, or 4.6 per cent, in the case of the public school children; and the percentage of orphans with intelligence quotients from 70 to 79 is twice as great as among the public school children (pp. 40, 55.) Distributions of persons diagnosed as mentally defective in a public school population, among dependent children, and among dependent adults, in a Cleveland survey are shown in Table 62.

TABLE 62

Percentage of Mental Handicaps among Public School Children, Dependent Children, and Dependent Adults in Cincinnati, 1922 *

Description	Number	Mental Handicaps: Percentages		
		Sub-Normal	*Borderline Mental Defect*	*Mental Defect*
Public school children, white	2,894	4.1	1.7	1.6
Public school children, colored	109	15.1	6.6	7.4
Dependent children, aged 5–18	359	12.8	6.7	3.3
354 white, 5 Negro				
Children's Home, 148				
General Protestant Orphanage, 123				
Bureau of Catholic Charities, 41				
Boarding homes, 47				
Dependent adults	258	10.5	10.9	10.5
Relief cases, Associated Charities (whites, only), 92				
United Jewish Social Agencies, 85				
Bureau of Catholic Charities, 61				

* Compiled from Anderson and others, 1922, *Report of the Mental Hygiene Survey of Cleveland*, pp. 42, 45, 46, 52, 62.

Among the problem children (referred by parents, teachers, or social workers, but limited to children attending public schools in a limited area) studied at the Bureau of Children's Guidance in New York City, Kenworthy finds over-representation of children with very superior intelligence, and somewhat greater over-representation of children with very inferior intelligence. In other words, children who are unusual, whether "too wise for their years" or "too stupid to learn," are more likely to make serious trouble for their teachers and their parents than ordinary children. The very bright children, however, are less apt to appear in juvenile courts or to be sent to reformatories. Kenworthy's findings in this regard are confirmed by other studies (*see*, for example, Witty, 1930).

A larger proportion of the mentally deficient but fewer of the very superior children are usually found among juvenile delinquents, represented in court or institutional series. One must bear in mind that arrest for delinquency is in part a class phenomenon, especially in the case of juvenile delinquency. There may be many children with "bad" dispositions in prosperous families, but they are subject to closer supervision, so that poor children are more apt to find themselves in court or to be sent to reformatories. Healy and Bronner report that 10.1, 11.2, and 15.4 per cent, respectively, of three series of repeating male juvenile offenders (1,000 in each series) studied in Chicago and Boston, are "clearly feebleminded," and 18.1, 13.5, and 18.0 per cent of the females in a similar series may be so classified (p. 273). This study also affords a valuable analysis of many complex personal and social factors which influence juvenile delinquency.

A report on the intelligence of unmarried mothers in 7 maternity hospitals in Minneapolis and St. Paul, in 1927, shows a normal proportion of persons of superior intelligence, but an excess of the dull and mentally deficient, especially among the older subjects. These results are shown in Table 63.

TABLE 63

INTELLIGENCE QUOTIENTS OF 344 UNMARRIED MOTHERS IN MATERNITY WARDS OF 7 HOSPITALS IN MINNEAPOLIS AND ST. PAUL, COMPARED WITH THOSE OF 7,656 SCHOOL CHILDREN *

I.Q. Classes	Unmarried Mothers [a]		School Children	
	Number	*Per Cent*	*Number*	*Per Cent*
Above 125	35	9.58	586	7.66
Above 115	55	15.98	1,424	18.61
Below 85	166	43.30	1,288	16.83
Below 75	82	23.84	396	5.18

* Adapted from Lowe, 1927, "The Intelligence and Social Background of the Unmarried Mothers," *Mental Hygiene*, Vol. 11, pp. 783–794.

[a] Examined four weeks after delivery.

There has been a great deal of controversy about the mental status of criminals. The truth seems to be that a large proportion of the inmates of most penal institutions come from families of low intellectual development, as well as low economic status, but that an absolute elimination of mental deficiency would still leave the most serious aspects of the crime problem unsolved. Evidence on the subject is summarized by Doll as follows:

> "A series of studies over a period of years in the New Jersey State correctional institutions has consistently showed about 30% of delinquent boys, about 15% of reformatory young men, and about 8% of adult male prisoners feebleminded, these diagnoses being made with disregard for the influences of age, color, nationality, social status, educational opportunity, and the like. . . .
>
> "A second method of approach, by means of formal mental tests, has consistently failed to show, except for the high percentage of feeblemindedness, a

> striking inferiority of average criminal intelligence as compared with non-criminal intelligence, when allowance is made for selective influences.
>
> "As has been mentioned, the percentage of mental deficiency decreases as one progresses from juvenile delinquents to youthful offenders and to adult prisoners. Likewise, the recent studies have definitely showed intelligence superiority rather than inferiority on the part of recidivists" (pp. 529–530).

The extensive investigations on criminal intelligence by Murchison, using Army Alpha tests, show that the distribution of intelligence among criminals resembles that of the general population more closely than usually supposed.[10] Murchison gives a very valuable classification of intellectual levels in relation to types of crime. This analysis shows distinctly superior intelligence as characteristic of the whole group of persons convicted of obtaining property by fraud, in spite of the fact that many of the "smartest" members of this class must escape criminal prosecution. This suggests that families who enjoy superior economic status by virtue of fraud may be as well equipped intellectually as those who have achieved such status through more honorable and arduous methods. On the other hand, high frequency of mental deficiency is found among persons convicted of physical violence (other than robbers and kidnappers, who appear fairly normal intellectually), social dereliction (chiefly desertion, "the poor man's divorce"), and sex crimes (under circumstances in which the offender is apprehended). The incidence of mental deficiency in these cases is similar to that observed among juvenile delinquents.

Dependent families (in normal times) and convicted delinquents constitute selected classes, largely recruited from the less privileged social strata—just as the professional families constitute a selected group, largely recruited from the more privileged classes. Opposite extremes of intellectual development show high frequency in these contrasted special classes. These results are consistent with the more comprehensive picture of the normal distribution of intellectual development in different social classes described in the previous section, but they show these differences in an exaggerated form.

3. *Intelligence in Relation to Social Status among Farmers*

Differences in intellectual development among agricultural groups classified according to location have already been described. But in most rural communities there is little differentiation of the agricultural population into distinct social classes.[11] Sorokin and Zimmerman, in *Principles of Rural-Urban Sociology*, lay much stress on the relative social homogeneity of the farm population in most regions in contrast to the economic and socio-political stratification of city populations. In the South, in addition to the outstanding race-class or caste division between whites and Negroes, there is a somewhat greater social differentiation among white agricultural workers than in other parts of the country. For example, Gee describes a well-marked social stratification of the residents of a cotton-growing community in the Piedmont area of South Carolina, which checks well with certain objective criteria. He remarks, "Whatever may or may not be the case elsewhere, in many sections of the South it is possible, with a marked degree of exactitude, to sort the population of a community into an upper, a middle and a lower class" (p. 211).

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[10] The presence of a higher proportion of men with low intelligence scores among criminals, however, tends to be obscured in Murchison's data. He avoids a comparison between the total white criminal group and total white draft, but compares native white criminals with *total* white draft in the United States as a whole, and in five Northern states separately. These two groups show approximately the same distribution (pp. 41–57). But the percentage of low Alpha scores of the white draft from Northern states is increased by the presence of foreign-born men, many of whom suffered from language as well as cultural handicaps. Murchison, however, clearly shows that geographical differences in test-intelligence are greater than differences between criminals and non-criminals, so that native-born white criminals in the North appear equal or superior to the white draft from Southern states.

One would not expect much social stratification in the Appalachian area. Nevertheless, Stroud, in a study of families in an Appalachian district (Union County, Georgia, and part of Towns County, Georgia) girded by the Blue Ridge Mountains, found a positive though fairly low correlation ($r = .25$) between the intelligence quotients of 1,057 children and the tax assessments of their families. This study was made in what might be designated as a poor farming section. The population studied consisted entirely of native-born whites, with relatively small differences in economic status, modes of living, social conditions, and educational advantages.

Unfortunately few exact studies of this sort for agricultural groups in the United States have come to the attention of the present writers.[12] Presumably, social differentiation is at present less marked in rural-farm groups than in village and urban populations. In some areas, at least, there appears to be a low positive correlation among farm families between degrees of intellectual development of children and degrees of socio-economic status; but data on this subject are very meager. It is possible that trends toward highly organized commercial farming, with hereditary land holdings, and toward subsistence farming in some areas may increase rural social stratification in this country.

4. *Conclusions*

There are marked differences between occupational groups in their cultural-intellectual development as measured by intelligence tests. A great number of studies have been made on this subject, and, with a few exceptions, the results obtained are extraordinarily consistent. These studies often show a difference of twenty or twenty-five points in average intelligence quotient between the uppermost and the lowest of five main occupational groups. Classification by income, or by other indices of social status, usually yields somewhat similar results. There is, at present, less statistical evidence of such social differentiation in farm groups.

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[11] In Ohio, according to Lively and Beck, the differentiation as regards length of schooling between farm owners, farm renters, and farm laborers is small; but their findings may be influenced by a tendency for young men to remain for a period as "farm laborers" on farms belonging to their fathers or neighbors. Among adults brought up on farms and remaining in agriculture in Ohio, in a sample studied by Beck and Lively, 76 per cent of the owners (101 cases), 85 per cent of the renters (126 cases), and 80 per cent of the laborers (60 cases) are reported as having only elementary schooling; 16 per cent of the owners, 11 per cent of the renters, and 12 per cent of the laborers completed high school; but the proportion of those who dropped out before completing the elementary grades among the farm laborers (17 per cent) is more than twice as high as among either of the other groups (pp. 32–33).

[12] MacDonald, 1925, has reported fairly well-marked gradations in average intelligence ratings for agricultural classes in the Isle of Wight.

There is much overlapping of individual abilities among all social classes. Nevertheless, the relatively high frequency of persons of unusual ability in the upper social groups and the relatively high proportion of mental defectives or persons with very inferior intellectual development in the lowest social groups is one of the striking results indicated in the survey.

The causal interpretation of these findings will be treated in Chapter X.

PART III

INFLUENCE OF DIFFERENTIAL REPRODUCTION ON THE CHARACTERISTICS OF THE AMERICAN PEOPLE

CHAPTER IX

SOCIAL SIGNIFICANCE OF GROUP DIFFERENTIALS

We have traced the varying rates of reproduction of different population groups in the United States (Part I), and taken account of variations in measurable traits among these groups, with special attention to levels of cultural-intellectual development (Part II). These two sets of data will be brought together in this chapter and the next, in order to appraise the influence of differential reproduction on the cultural-intellectual development of our people from one generation to another. We have already noted that "cultural-intellectual development" is the combined product of social heritage and biological heritage (Chapter VI, Section 1). In order to simplify the discussion, population changes will be treated in this chapter merely as they affect our social heritage, and the questions relating to genetic heritage will be taken up in the next chapter.

The cultural level of each generation determines in high degree the environmental factors that will affect the intellectual development of the next generation. We have already seen that cultural-intellectual development, which is an outward, manifest characteristic, can be measured with considerable accuracy. At least the results obtained by different methods of measurement are in substantial agreement. Results obtained by standardized mental tests supply data that make possible objective comparisons between different groups on this level of manifest development. The possible biological significance of present population trends, which will be discussed in the next chapter, cannot be treated so directly. But in dealing with social heritage, one can measure the relationship between variations in the "intelligence" of children derived from different parental groups (e.g., as the children enter public school) and variations in reproduction rates among different parental groups, and in this way determine tendencies in cultural-intellectual development, as affected by differential reproduction. The whole procedure in this chapter thus remains on the level of observed differences that can be treated quantitatively.

It must not be thought that the social heritage of a people is unimportant as a factor in the development of intelligence, or that its effects can be rapidly altered by education. Psychologists are pretty generally agreed that home environment, which includes the intellectual status of the parents, is at least as strong a force in the intellectual growth of the child as formal education; and in a democratic country, the quality of the formal education offered tends to vary with the intelligence of the community. The studies of psychologists have shown that in most cases the intelligence quotients with which children leave home and school will be changed very slowly, if at all, during later life. Under the greatest possible improvement in the environment of any group with a serious initial handicap, several generations will pass before this cultural lag is entirely overcome. Differential fertility may, therefore, have a quite tremendous effect on the cultural-intellectual level of the country as a whole, through the disproportionate spread of one social heritage instead of another.

1. *The Influence of Regional Variations*

The most conspicuous feature of a demographic map of the United States is the high fertility of the rural South. We may note three main population groups, included in this broad area, listing them in order as regards present reproduction rates—although there is some doubt about the relative order of the second and third groups.

a. *The Southern Appalachian Highlands.* There are over two million persons living on farms in the valleys and on mountain sides of the Southern Appalachians. The density of population in many of the mountain counties is similar to that for the total United States (41.3 persons per square mile), above that of Northern New England, West North Central, and Pacific states, and far above that of the Rocky Mountain division (4.3 persons per square mile). Much of the land is useless or unprofitable, however, so that population pressure on natural resources is probably higher in this section than in any other part of the country. The rate of natural increase has begun to decline; but a rate of increase well above that of the general population may be expected in this area for many years to come.

Environmental conditions in a large part of this region are such that average intelligence quotients in many communities, on standard tests, are around 80 points. No serious student believes that such ratings give any adequate indication of the hereditary capacities of the people in this region. These results point rather to an environment which has a very retarding influence on the cultural-intellectual development, as judged by urban standards. Many people must migrate in the near future from this area with limited economic resources but rapidly expanding population. In view of their social background, these migrants are likely to have great difficulty in adjusting to social conditions in other regions.

The future development of communications seems likely both to increase the cultural stimulus to intellectual development, and to cause some decline in the birth rate. There is, however, the possibility that the people of this region may be selected more and more from families left behind from successive out-migrations. If so, it seems extremely likely that many superior individuals will be included among the migrants who do not return, whereas those who return may include a disproportionate number of persons unable to adjust to urban life.

b. *Negro farm families.* Negroes comprise 15.5 per cent of the total farm population of the United States. Evidence reviewed above suggests that the birth rate among Negro farm families is at present as high as, and is not dropping quite so rapidly as, among white farm families in Southern states.

The rural-farm Negro population of the United States decreased about 400,000 between 1920 and 1930, while the rural nonfarm Negro population increased slightly, and the urban Negro population apparently increased about 1,600,000; but these figures, especially the last, may be somewhat affected by greater accuracy of enumeration in 1930 than in 1920. Therefore, inasmuch as the urban Negro population is not self-replacing, Negro farm families must have released well above a million new migrants into village and urban communities during the last decade. Some of these migrants may have returned to their home communities since the depression.

The present general level of cultural-intellectual development among Negro farm families is extremely low, with high frequency of very retarded intellectual development. Sickness and death rates are also high among Negroes, both urban and rural. The environmental influences affecting the development of children in these families are obviously extremely adverse.

c. *Native white families in most rural-farm communities in the South.* The rural South, as a whole, is characterized by high reproduction rates, although a sharp decrease in fertility has recently been taking place. These high reproduction rates are generally associated with low scores for cultural-intellectual development—both in the old Atlantic Seaboard states and in the Mississippi Valley.

Southern farm groups, combined, comprise more than 50 per cent of the total farm population of the United States, and are apparently our most important source of future population supply.

d. *Other farm groups.* Farm families in some parts of the Mountain division and in the Dakotas also show unusually high reproductive rates. The ten states of the Mountain division, plus North Dakota and South Dakota, contain only about one-sixteenth of the rural-farm population of the United States. In this section, as in many of the Southern states, birth rates now are declining rapidly. In fact, the effective fertility of the native white population was lower in 1925–1929 in Colorado (where urban influences are strong) and in Nevada and Arizona (which adjoin the Southern Pacific area) than in most other parts of the United States. This area is characterized by a high level of intellectual development, in spite of the isolation of many of the families living in these states. It is significant that the lowest rejection rates for mental deficiency among drafted men anywhere in the United States were found in states of the Mountain division.

Rural populations in other sections of the country, New England, the Middle Atlantic, North Central, and Pacific states, are characterized by birth rates that are lower than the rates in the rural South and most of the Mountain states, but are still well above replacement requirements, and far above birth rates for cities in the same states. In some sections, notably Northern New York State and Northern New England, reproduction rates now appear to be stabilized at such a level as to supply a constant source of gradual population increase—until disturbed by some unexpected social changes. This statement remains valid with regard to the older native stocks in this region, after allowance has been made for the unusually high fertility characteristic of some of the newer stocks, notably the French Canadians.

Farm children usually score somewhat below city children of the same general region in intelligence test performance. Studies of rural-urban migrations to and from prosperous farm areas, however, give no indication of any significant selective trend in these movements. Furthermore, the analysis of specific intelligence test items show that much of the rural-urban differences in test intelligence should be attributed to the nature of the tests and to the effect of local differences in intellectual stimulus.

Rural-urban differences in culture and in fertility have already been discussed at length, and it has been shown that cultural-intellectual development is highest in the cities, and that fertility is highest in the country. To a large extent, therefore, regional differences in culture and fertility are simply a reflection of rural-urban differences, and in the regional division by states this point must always be kept in mind.

An accompanying map (Figure 42) shows the relationship between regional variations in reproduction trends and regional variations in level of cultural-intellectual development by states, as of 1920. This map is based on two sets of data previously described:

1. Approximate rates of natural increase or decrease per generation of the native white populations of the several states, derived from observed ratios of children under 5 per 1,000 women aged 20–44, and estimated permanent replacement values in 1920, and

2. Indices of cultural-intellectual development of the population of different states.

This chart is introduced merely to give a graphic portrayal of possible changes in the distribution of cultural-intellectual influences through the operation of regional differences in reproduction trends. It cannot be taken as an accurate representation of actual conditions. The most important limitations may be stated as follows:

1. The chart represents cultural-intellectual levels as of 1920. We may probably assume a progressive trend toward standardization of education and a greater tendency toward uniform cultural patterns in different sections of the country.[1] This process can be easily measured in the case of the percentage of illiteracy among native whites, ten years old and over. For example, between 1920 and 1930, the illiteracy rate for this class in the popu-

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[1] This expectation will probably be realized gradually, in spite of great reverses in educational progress caused by the economic depression.

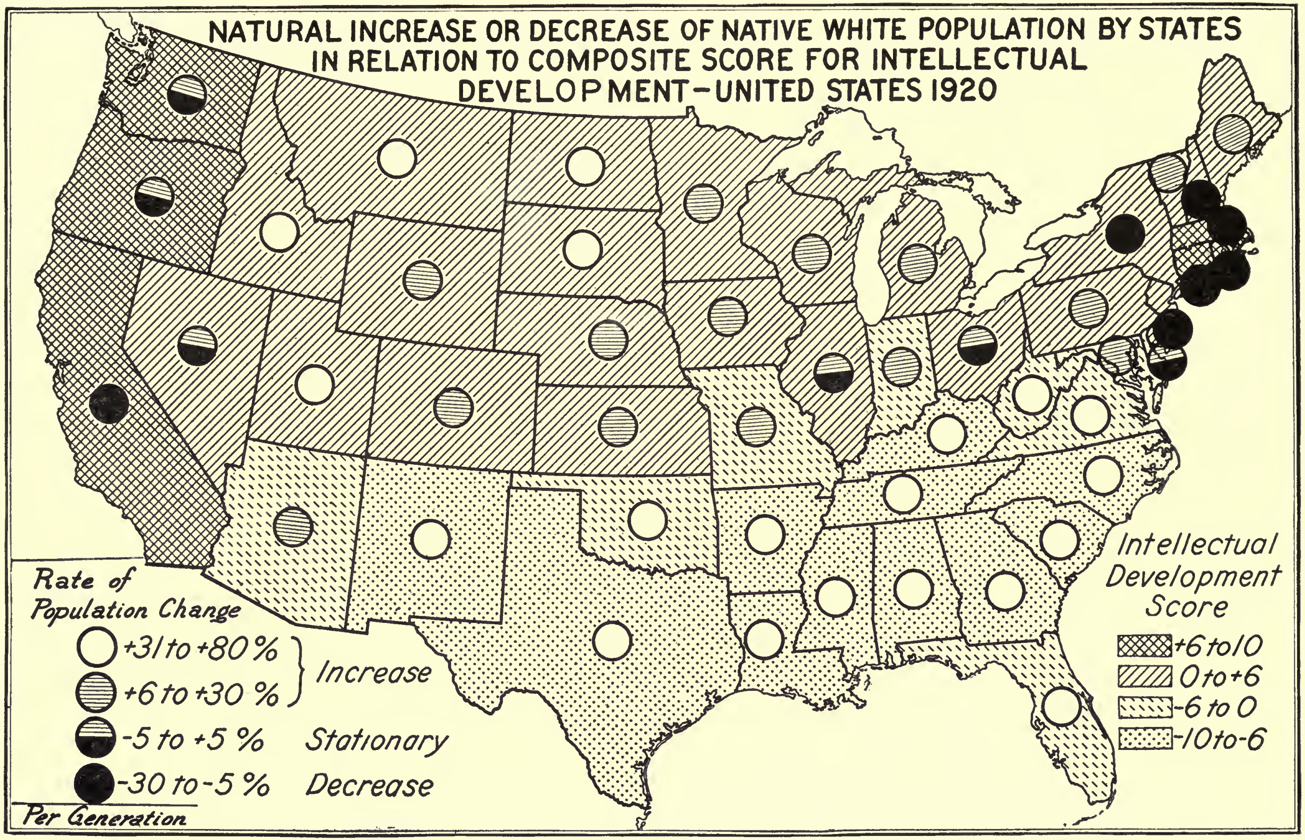
NATURAL INCREASE OR DECREASE OF NATIVE WHITE POPULATION BY STATES IN RELATION TO COMPOSITE SCORE FOR INTELLECTUAL DEVELOPMENT–UNITED STATES 1920
Rate of Population Change
○ +31 to +80 %
◍ +6 to +30 %
Increase
◒ -5 to +5 % Stationary
● -30 to -5 % Decrease
Per Generation
Intellectual Development Score
▩ +6 to 10
▨ 0 to +6
▧ -6 to 0
▒ -10 to -6

FIG. 42. NATURAL INCREASE OR DECREASE OF NATIVE WHITE POPULATION BY STATES IN RELATION TO AVERAGE COMPOSITE SCORE FOR INTELLECTUAL DEVELOPMENT, UNITED STATES, BY STATES, 1920.

lation dropped from 0.9 to 0.7 per cent in the East North Central states but from 6.4 to 5.0 per cent in the East South Central states, and from 4.1 to 2.0 per cent in the West South Central states. With the progress of education and facilities for communication, we may expect a great reduction of differences in average intellectual development between groups in different sections of the country.

2. The reproduction indices for the native white populations of the several states already show somewhat smaller and somewhat different variations on the basis of 1930 data; but the general picture presented by these data does not differ greatly. There is reason to expect a progressive narrowing of regional differences, but not their disappearance.[2]

3. Only native white populations are here taken into account in analysis of reproduction trends. There is every reason to believe, however, that the negative correlation between reproduction and intellectual status among Negroes, classified by residence, would be even higher than that indicated in this chart for native whites.

4. The different items in the composite score relate to varying groups. At first, this would seem to be a very serious objection, but further examination of the materials shows that if data were available on all native whites and no others the results would not be very different from those which appear. The position of a few individual states would be shifted, but the regional variations would approximate those here represented.

It appears that for some time a disproportionate share of successive generations is likely to be drawn from areas that are now characterized by rather low cultural-intellectual development and poor educational opportunities. The effect of this tendency on the cultural and political life of the nation cannot be lightly gainsaid.

The effect of the disproportionate fertility of some groups in retarding their economic and cultural advance also merits serious attention. One of the results of a recent study of economic and social conditions in the Southern Appalachians, conducted under the auspices of the United States Department of Agriculture and several state Agricultural Experiment Stations, is stated as follows:

> "The studies [on family living in Laurel and Knott Counties, Kentucky, and Grayson County, Virginia] indicate that the large families of the highlands have tended to lower the level of living. They not only show that per capita value of living is lower in larger families than in small ones, but also that it is lower on smaller farms than on larger ones. Many of the small farms represent patrimonies sub-divided among the large families of the last generation." (From "Conclusions" to section on "Variations in Farm Family Living," Williams, 1934).

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[2] The accompanying diagram was prepared before the 1930 data had been worked up. The indices of effective fertility based on 1920 data are more appropriate, in any case, because the indices of cultural-intellectual development are based on data collected during the years 1917–1922.

Rupert Vance, of the University of North Carolina, in *Human Geography of the South* (perhaps the best book yet written on the social and economic life of the South) has stated very clearly this drag of excessive fertility on educational progress in the rural South.

> "The population [in the Southern states] is a young population with consequently greater tasks of education than other areas. While the South possesses 1,034 children under 15 years of age for every 1,000 adults, the North has only 782, and the Pacific Coast 599. Granted equal resources, the educational task per adult would remain much greater in the South. It is the farming environment which conditions a high birth rate, and a large majority of these children are on the farm. Moreover, the low density of an agricultural society operates to make the educational task more formidable. Eleven southern states, possessing one fourth of the nation's population, have and must educate one-half of the nation's farm children" (p. 480).
>
> "For the same number of adults the cultural task of education is much greater in the South. Moreover, the low density of population attendant upon an agricultural society increases still further the regional differences. . . . The bi-racial segregation of the South cuts across the institutional plane dividing the cultural institutions into two sets. Dual education then functions to lower the effective density of the population. Thus it happens that Mississippi ranks as the first state in the percentage of her population, 33.8, enrolled in schools, and the last in days of attendance at school, 98.1.
>
> "Under this regional process aided by the restriction of foreign immigration, the South is in the position of rearing and educating, however imperfectly, the labor reserves for the rest of the nation. To low standards already existing will increasingly be added the enforced mobility characteristic of populations which have outstripped their resource structure. The alternative lies in the adjustment of a decreasing rate of population growth to an increasing utilization of regional resources" (p. 481).

Thus, a vicious circle is apparent. *Retarded development fosters the maintenance of excessive fertility; and excessive fertility tends to retard economic and cultural development.* The situation is aggravated by an apparent tendency for many of the most ambitious young people to locate in cities or in other regions.[3] These considerations have been developed chiefly with reference to rural sections of the South; but they apply with equal force to scattered communities in some old agricultural areas with limited or declining resources in New England, the Middle Atlantic, and East North Central states. Vance, in the last sentence cited above, offers a practical suggestion that fits with some of the suggestions that will be introduced later in the present study (Chapter XIII, Section 1).

2. *Variations among Groups Classified by Race or National Origin*

Race groups and immigrant groups exert an influence on population increase that is likely to be fairly persistent where these groups are so situated as to preserve traditional culture patterns, for example, the French Canadian group in New England, Germans in North Dakota and neighboring states, Mexicans in the Southwest, and Negroes in the rural South. Wherever high fertility among racial groups in certain regions is associated with low levels of cultural-intellectual development, exactly the same inferences may be drawn regarding the significance of this relationship for the social heritage of the nation, as have already been developed in the previous section.

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[3] *See* Chapter X, below.

Moreover, in the case of some "racial" groups which are predominantly located in rural communities where they are more or less isolated culturally (e.g., Negroes, Mexicans, and, somewhat less markedly, Japanese and French Canadians), the combination of racial differences and regional isolation intensifies the difficulties of group accommodation. Thus, among Negroes as among whites, a marked negative correlation exists between variations in cultural-intellectual level and variations in fertility. Urban Negroes, as a class, are not self-replacing; but rural Negroes are characterized by a rather high rate of natural increase. Thus as urban Negroes, with raised cultural-intellectual status, begin to effect satisfactory social adjustments, their situation is aggravated by a constant stream of poorly educated migrants from the Negro masses in the rural South. This complicating factor, rooted in the high reproduction rates of retarded rural groups, has rarely received the attention it deserves by students of racial adjustments in this country.

On the other hand, the children of immigrants in large cities—and most of the recent immigrant stocks in this country are concentrated in urban centers—are becoming rapidly assimilated in American city life, with a corresponding sharp decline in fertility in comparison with that of their immigrant parents. No large persistent differential, as regards reproduction, is to be expected between the newer stocks of European extraction and the older native stocks. In fact, the reverse situation may be expected because of the predominantly urban residence of the newer stocks. This view is confirmed by two facts noted above: (1) a negative correlation appears, with 1920 data, between ratios of children to women and percentage of total population who are of foreign birth, in all cities of 25,000 population or more; and (2) the median size of family in 1930 was larger for native whites of native parentage than for native whites of foreign or mixed parentage, in the total United States.

It is possible, however, that in some cases there may be a fairly persistent negative association between cultural-intellectual status and fertility, among urban groups classified by national origins. The results of Maller's study of social and demographic data for 275 New York City health areas seem to be in line with this suggestion. The correlations found by Maller between the birth rate and other variables are shown in Table 64.

It is very clear from this table that there is no significant general relationship between proportion of foreign-born and birth rate in New York City areas. It is also shown, by other data for these areas, that there is no con-

TABLE 64

Correlation between Birth Rate and Other Vital Psychological and Social Factors, 275 New York City Health Areas [a] 1930 Data *

Other Factors	Correlation with Birth Rate
	r
Intelligence quotient	−.34
School progress	−.30
School attendance	−.05
Death rate	.06
Infant mortality rate	.04
Juvenile delinquency	.28
Proportion foreign-born	.006

* Abstracted from Maller, 1933, "Vital Indices and Their Relation to Psychological and Social Factors," *Human Biology*, Vol. 5, p. 104.

[a] Areas with large Negro populations excluded from analysis.

sistent relationship between proportion of foreign-born and various social factors—and where small differences of this sort do appear they are, in many cases, favorable to the areas with high proportion of foreign born.

On the other hand, a definite relationship does appear between the frequencies of certain foreign stocks and birth rate, other vital indices, intelligence quotient, and various social factors. The contrast in intellectual development, shown by Maller, between the areas that are predominantly Jewish and the areas that are predominantly Italian has already been described. Variations in birth rate and other vital and social indices between these two groups of areas are shown in the following table.

TABLE 65

Estimated Net Fertility in Relation to Intelligence Test Ratings of Children for 15 Jewish Areas and for 15 Italian Areas in New York City, 1930 *

Health Areas	Mean I.Q.'s	Births per Year per 1,000 Total Population (a)	Deaths under One Year per 1,000 Infants (b)	Estimated Infant Deaths per Year per 1,000 Total Population (c)	Estimated Net Fertility Rate [a] (a-3c)
15 Jewish areas	106.2	18.45	46.50	.8579	15.88
15 Italian areas	87.8	23.15	58.17	1.3466	19.11
	Per Cent	*Per Cent*	*Per Cent*	*Per Cent*	*Per Cent*
Ratio of values for Italian areas to values for Jewish areas	83	126	125	157	120

* Data from Maller, 1933, "Vital Indices and Their Relation to Psychological and Social Factors," *Human Biology*, Vol. 5, p. 119.

[a] Total mortality decrement estimated as three times infant mortality rate.

Such differences, though significant, can be largely resolved into differences between occupational classes. There is no evidence to indicate significant differences in intelligence between native-born Americans derived from different European groups within the same occupational classes. Similarly, differences in fertility between native-born urban Americans within any large occupational class or within any given I.Q. class are probably so small as to have no social significance. In general, then, unless we are dealing with racial groups which are isolated geographically or by rigid caste lines, we may assume that differences in reproduction which are significant for social heritage in the case of groups classified by national origin may be resolved into differences between social groups, and treated more effectively on that basis.

3. *Variations among Social Groups*

Negative association between fertility and social status, and positive association between cultural-intellectual level and social status for the population of the United States during recent decades have been clearly demonstrated (*see* Chapters IV and VIII). Since both types of association have been given quantitative expression, the two series can be quantitatively combined, so as to supply an arithmetic index of the influence of differential reproduction by occupational class, on the expected distribution of levels of cultural-intellectual development in two successive generations. In this way we can obtain some objective indication of the social significance, as regards cultural-intellectual development, of present reproduction trends among social groups in the United States.

The Haggerty-Nash series of intelligence test data on New York State elementary school pupils, classified by occupation of father, are selected for comparison with the reproduction trends of occupational classes, based on birth and infant mortality statistics. The intelligence test data, reported in 1924, are based on the performance of 6,688 public school pupils, in Grades III–VIII, in towns of less than 4,500 inhabitants, on the Haggerty Intelligence Examination (Delta 2). The reasons for the selection of this particular set of data are as follows:

1. The results are generally accepted as the work of competent psychologists, and have never been subjected to damaging criticism. Intelligence quotients derived from the Haggerty tests are not exactly equivalent to intelligence quotients based on Stanford-Binet performance, but the former are reliable for group comparisons at the age levels used here.

2. The sample is large enough to supply adequate numbers for the main occupational classes, ranging in size from 349 children of professional families to 3,098 children of farm families.

3. The influence of regional variations is minimized in this series of intelligence test data, the environmental situation of the children examined being as homogeneous as could be expected in any sample large enough to supply an adequate basis for comparison between occupational classes. All the children have had the advantage of a well-standardized public school

system. They all live in small towns in the same state. The environmental difference between children of farmers and the children of fathers engaged in other occupations is especially minimized in this analysis. The median test score for the farm children in this sample is 95 per cent of that for the total sample, whereas the median score for drafted farmers was only about 75 per cent of the general median.[4]

The environmental influences in this series are practically reduced to differences in home culture, in part affected by birthplace of parents (since the sample includes children of foreign as well as native parentage), but chiefly attributable to differences in outlook and interests which are inherently related to occupational activities. The latter set of environmental factors may be assumed to be fairly continuous in their operation, at least so long as the present economic system remains in force. Other studies in which differences in nativity of parents have been eliminated show differences between occupational classes of the same general character, although somewhat modified in some instances.

4. Haggerty and Nash report detailed analysis of the composition of their main groups, so that it is possible to make up comparable classes in the analysis of reproduction trends, on the basis of the detailed classification of occupations reported in *Birth, Stillbirth and Infant Mortality Statistics for the Birth Registration Area of the United States.*[5] In all cases the same occupations have been assigned to the same main groups in both computations, except types of occupation not mentioned by Haggerty and Nash. The doubtful additions to the unskilled group are sailor, soldier, elevator tender, servant, and waiter, all low fertility classes. If these groups had been assigned to the semi-skilled group, the reproduction rate for unskilled workers would have appeared slightly higher than that here reported. The semi-skilled group is a "catch-all" in this analysis. as in most occupational classifications. Following Haggerty and Nash, it includes brakeman, policeman, barber, guard, janitor, and porter, as well as "semi-skilled factory operatives." The last class (reproduction index, 104) supplies about half of the total semi-skilled group (reproduction index, 103). The business and clerical group is also rather heterogeneous—especially since, following Haggerty and Nash, it includes foreman, as well as executive, office worker, salesman, contractor, clerk, station agent, retail merchant, real estate or insurance agent, manufacturer. The class of "retail and wholesale dealers, importers and exporters," which is the largest sub-class in this whole group, has a reproduction index (93) well above that of the whole business and clerical group (85).

5. The authors show detailed distribution of intelligence quotients by occupational classes. It is therefore possible to give adequate weight to the

---

[4] The results of our computation would be somewhat modified, but not radically changed if the agricultural groups had been omitted altogether.

[5] *See* Chapter IV.

number of bright boys and girls appearing among the children of unskilled workers and similarly to the number of dull children coming from business and professional groups. In other words, the important factor of *overlapping* between different classes in distribution of intelligence is taken into account.

6. Finally, the use of scores derived from examinations of offspring of fathers in different occupational classes avoids the complication of expected genetic variations between parents and children. Such variations, except in so far as they are obscured by environmental influence, are already taken into account in this process.

We will repeat the table of distribution of intelligence quotients by occupational class, reported by Haggerty and Nash, and then we shall apply this distribution to:

First generation: absolute numbers of births attributed to fathers of comparable occupational classes in United States Birth Statistics, 1928; and

Second generation: estimated numbers of grandchildren who would be born to these same fathers, if the reproductive trends indicated in the 1928 Birth Statistics were repeated in the next generation.

The results of this analysis are shown in summary form in Table 66 (*see also* Figure 43). The absolute figures used in this process are given in Appendix Q.[6]

TABLE 66

INFLUENCE OF DIFFERENTIAL REPRODUCTION, BY OCCUPATIONAL CLASS, ON EXPECTED DISTRIBUTION OF INTELLIGENCE QUOTIENTS OF UNITED STATES SCHOOL CHILDREN IN TWO SUCCESSIVE GENERATIONS.[a]

Haggerty I.Q. Classes	First Generation	Second Generation	Change
	Per Cent of Total	*Per Cent of Total*	*Per Cent*
140 & up	1.71	1.50	−12.3
130–139	3.25	2.88	−11.4
120–129	7.17	6.46	−9.9
110–119	11.91	11.44	−3.9
100–109	17.24	16.93	−1.8
90–99	21.28	21.64	+1.6
80–89	18.67	19.31	+3.4
70–79	12.01	12.65	+5.4
60–69	5.30	5.61	+5.8
50–59	1.46	1.59	+8.8
All classes	100.00	100.00	—
	I.Q. points	*I.Q. points*	*I.Q. points*
Median[b]	95.90	95.01	−0.89

[a] The figures in this table differ in some cases by one point in second decimal from figures published in chart, due to errors corrected in rechecking. The second decimals are not significant, but are carried to avoid errors in process.

[b] If *means* are computed for both generations, using the central points of each I.Q. class, and taking 145 and 55 as the central points in the top and bottom classes, respectively, a very similar but slightly greater change in central tendency is indicated than the change reported above on the basis of a comparison of estimated *medians*.

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[6] With reference to absolute figures it may be noted that the absolute numbers for the second generation may be assumed to be too high, since birth rates are falling in all occupational classes. But this does not affect the relative values in which we are interested. Of course, if reproduction

These results indicate a tendency toward a gradual lowering of the average cultural-intellectual level of the American people as an effect of present reproduction trends among different social groups. This tendency appears small in its effects on average level, but quite large in its effects on the frequency of superior and inferior levels. This tendency may, in any case, be temporarily offset by the influence of economic, educational, and cultural advance. In so far as this tendency is due wholly to environmental factors it might be indefinitely offset by cultural advance. But, even so, it constitutes a serious counter force, diametrically opposite in its effects, to the conscious aims of all public educational efforts. It means the diminution of those influences in our social heritage which are most carefully nurtured, and the increase of those influences which are least in line with accepted educational objectives. If part of this tendency toward a lowering of cultural-intellectual levels in this country, resulting from differential reproduction among social groups, may be attributed to the influence of hereditary factors, the problem raised becomes still more serious. But the whole question of the relation of cultural-intellectual levels to hereditary factors is reserved for separate consideration in the next chapter. We are dealing here merely with the effects of present population trends on social heritage.

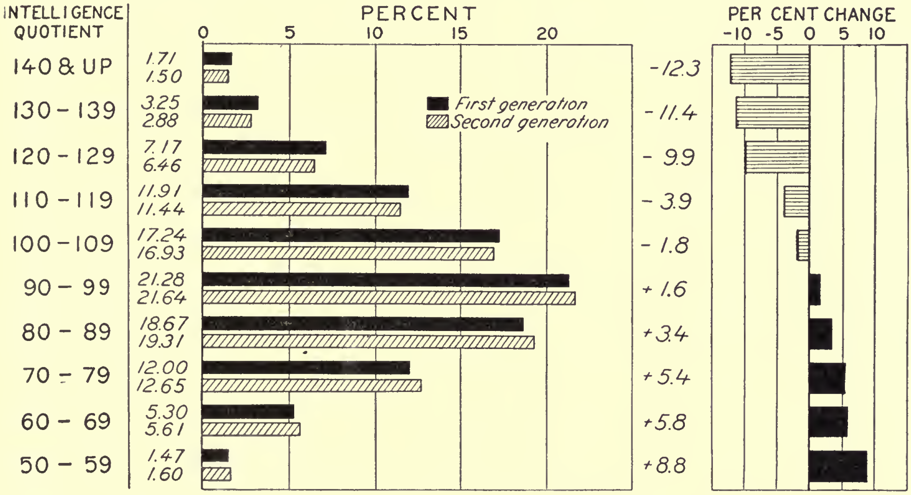

FIG. 43. INFLUENCE OF DIFFERENTIAL REPRODUCTION AMONG SOCIAL CLASSES ON EXPECTED DISTRIBUTION OF INTELLIGENCE QUOTIENTS OF U. S. SCHOOL CHILDREN IN TWO SUCCESSIVE GENERATIONS—on the basis of: (1) I.Q.'s of school children, Grades III–VIII, rural New York, by occupational classes, according to Haggerty and Nash, (2) Numbers of births, children ever-born per mothers aged 30–39 years, and child-survivals, by similar occupational classes, *United States Birth, Stillbirth and Infant Mortality Statistics*, 1928, Table 10.

Several qualifications regarding this experiment need to be stated explicitly and several possible objections considered.

rates fall more rapidly in some classes than in others the future significance of our present results may be greatly modified. But that is another problem.

1. The experiment is based on the hypothesis that environmental influences on children brought up in different occupational classes remain constant. The effect of a general change in cultural influences is discussed above. Any changes in the relative cultural influence of homes classified by broad occupational classes may be expected to modify the results obtained here.

2. Similarly, the experiment is based on the hypothesis that differentials in reproduction among social classes remain constant. This is an hypothesis and not an assumption. If the present authors believed that differentials in reproduction are immutable, they would not be interested in the possibilities of social eugenics. Much attention throughout the work has been given to the analysis of changing population trends and their social causes. This computation is intended merely to show the effect of present differentials.

3. The results, as here stated, are valid regardless of the respective rôles of heredity and environment in causing the variations which are treated in this experiment.

4. The consideration that many individuals will enter social classes which are different from those of their parents does not invalidate the experiment in any way, assuming that the individuals who so change their social status adopt the fertility habits of the class into which they pass. In so far as there may be greater selectivity in the future than in the past in such occupational shifts, this would tend to intensify the effects of the tendency which we are discussing.

5. The data on differential reproduction are based on statistics reported by mothers. We do not have exact data on marriage rates by occupational classes. If it is supposed that 10 per cent more of women associated with unskilled manual workers remain childless because of lower marriage rates (which is possible but hardly probable), the reproduction rate for this class would be reduced from 1.17 per generation to 1.05. On this assumption the estimated change indicated in median intelligence test ability for the whole population would appear as 0.77 I.Q. points instead of 0.89 I.Q. points. Incidentally this indicates the effect of a moderate reduction in the present social class differentials, if their general character remained unchanged.

6. The consideration that some children are brighter, and others are duller, than their particular parents has also been taken into account, and does not affect this experiment, because we use intelligence data for the children themselves, although the basis of classification is the occupational status of parents.

7. The consideration that many bright children come from families in the lower occupational levels and many dull ones from families in the higher levels does not invalidate the experiment, because it was specifically set up so as to take these facts into account.

8. This experiment has been based on the hypothesis that all families

within each broad social class have equal reproductive tendency. This hypothesis will be investigated in the following section. Obviously, in so far as there may also be, in general, a negative association between fertility and intellectual levels within broad social classes, the effects described above will be intensified.

4. *Individual Variations within Social Classes*

There is only one large body of American data on the relationship of size of family to intelligence ratings (in this case, for children) within occupational classes. And in this case an indirect method must be employed, but one that yields conclusive results. Collins, 1928, supplies data for a large sample of elementary public school pupils in an Ohio city of about 45,000 population.[7] In his report Collins gives mean family intelligence quotients as well as mean individual intelligence quotients. A moment's reflection will suggest that combining scores into family groups gives greater statistical weight to small families. For example, if three persons in a population of four people have an I.Q. of 90 and the other person has an I.Q. of 100, the mean individual intelligence quotient for this little population will be 92.5 points. But if the three individuals with the low score come from one family, but the brighter individual comes from a one-child family, the mean family intelligence quotient (the average rating for the two families) will be 95 points. The direction and degree by which the mean of the family quotients, within any occupational group, differs from the mean of the individual quotients measures the association between size of family and intelligence within this group. If the mean of the family quotients is higher, a negative association is indicated between intelligence and fertility. This relationship is found in every large occupational class studied by Collins (*see* Table 67). It does not appear among farmers' children. This exception would be very interesting if based on an adequate sample; but unfortunately in this urban sample only 25 farm families are represented.

It is very interesting to find that the negative association between the intelligence of school children and the fertility of the families from which they are derived appears to be well marked within the broad occupational groups described in this study. Except for the miscellaneous group in which the occupation of the father is "unknown," the most conspicuous negative association of this sort between fertility and intelligence appears in the heterogeneous "trade" group, which includes small shop keepers, agents, and business executives. Well-marked differentials of the same character also appear among children whose fathers are classified as "professional," "foreman," "clerical," and "unskilled labor."

Unfortunately, comparable data are not available from any other large American studies, showing differences within occupational classes, although several studies are available which show individual variations without re-

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[7] Collins' study is described in detail in Chapter VIII.

TABLE 67

COMPARISON OF MEAN OF FAMILY INTELLIGENCE QUOTIENTS WITH MEAN OF INDIVIDUAL INTELLIGENCE QUOTIENTS IN VARIOUS OCCUPATIONAL CLASSES *

Group	Number of Families	Mean Family Intelligence Quotient	Mean Individual Intelligence Quotient	Per Cent Difference	Superior or Inferior Ratings Predominate in Large Families
Professional	90	115.92	114.53	1.21	Inferior
Managerial	165	113.24	112.68	.49	Inferior
Clerical	131	113.17	112.06	.99	Inferior
Trade	413	110.47	108.96	1.38	Inferior
Foreman	106	107.30	106.23	1.00	Inferior
Skilled labor	1,569	102.63	102.13	.48	Inferior
Unskilled labor	377	95.19	94.36	.87	Inferior
Agricultural	25	99.58	99.54	.04	?
Unknown	213	99.00	96.34	2.67	Inferior
Total	3,089	104.09	102.99	1.10	Inferior

* From Collins, 1928, "The Intelligence of School Children and Paternal Occupation," *Journal of Educational Research*, Vol. 17, p. 162.

gard to social status.[8] There is some evidence that among graduates from some Eastern colleges and universities, fertility may be positively correlated with social status.[9] This evidence, though hardly conclusive as yet, gives an interesting hint of a positive counter-trend in this country (already apparent in some European communities) which may eventually come to have large significance. We may also note that differential fertility among social classes may possibly be somewhat less marked in some of the older sections of the United States, for example, in New England, where the general birth rate for native whites has been fairly stationary for several decades, than in parts of the country where the birth rate has been rapidly declining during recent decades.[10]

A negative correlation between intelligence ratings of school children and size of parental family as found in an English study of mining communities shows a similar tendency in a more direct fashion. Sutherland reports results of intelligence tests given to 30,096 children of Yorkshire rank and file miners, living in small villages, and all receiving about the same wages. Correlations were worked out separately for boys and for girls, and for boys and girls combined. The intelligence quotients used in this study are derived from the Moray-House Group Tests. The correlations obtained between intelligence and size of family are as follows:

Girls only	$-.139 \pm .022$
Boys only	$-.115 \pm .020$
All children	$-.129 \pm .019$

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[8] *See* below (this chapter, Section 5).

[9] *See* Chapter XII, Section 4.

[10] *See* Chapter IV, Section 9.

The average intelligence quotients of the children in Yorkshire miners' families of 8, 9, 10, or more children, are 88.7, 88.8, and 89.4, whereas the average intelligence quotients of the children in families of 1, 2, or 3 children are 92.9, 94.9, and 92.6. These differences are small, as might be expected in view of the extreme homogeneity of the population studied. The peculiar significance of the study is that in spite of this unusual uniformity in situation a slight negative correlation still appears between intelligence and fertility.

We conclude that there is generally a negative correlation between fertility and intelligence ratings *within* social groups, as well as between social groups, in this country and perhaps in England. However, among some groups there may be a significant counter tendency toward positive correlation between intelligence ratings and fertility; also, the general relationship described above may be changed in the future. In any case, we shall see that there is a marked negative correlation between fertility and intelligence ratings for families represented in American school populations when studied individually, without regard to social status of parents.

5. *Variations in Fertility among Individuals Classified by Intelligence*

Chapman and Wiggins, 1925, supply coefficients of correlation between intelligence quotients of school children (based on National Intelligence Test Scores) and numbers of children in the families which they represent, for all public school children, Grades VI–VIII, in Meriden, Connecticut. Record was taken of birthplace of parents and of language spoken in the home, so that the influence of these variables could be controlled. Ratings on the Chapman-Sims Socio-Economic Scale were applied to data collected regarding home conditions.

The coefficients of correlations found among three variables are as follows (for 632 families):

	r
Size of family and I.Q.	−.33±.024
Size of family and social status	−.27±.025
Social status and I.Q.	+.32±.024
Social status and I.Q. (language factor eliminated)	+.31±.024

Separation of the American families from the foreign families results in a decrease in the size of the negative relationship between size of family and intelligence, but in each case the correlation remains clearly significant:

Correlation between Intelligence and Family Size (p. 418)

American families	−.22±.04
Foreign families	−.24±.05

Lentz, 1928, has supplied extensive data on the relationship between the intelligence of children and numbers of children in the families which they

TABLE 68

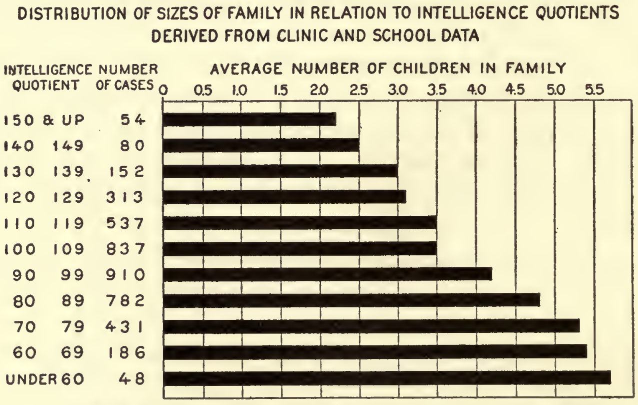
Average Intelligence Quotients (National Intelligence Test) of Public School Children, Grades VI–VIII, Meriden, Connecticut, Classified by Size of Family *

Class of Family by Number of Children Reported	Number of Families in Each Class	Average I.Q. of Children in Each Class	Standard Deviation (σ)
1	63	117	17.5
2	129	118	19.5
3	99	114	19.0
4	87	108	19.1
5	72	106	16.0
6	42	106	13.2
7	39	105	18.6
8	42	103	16.8
9 or more	56	98	15.5

* From Chapman and Wiggins, 1925, "Relation of Family Size to Intelligence of Offspring and Socio-Economic Status of Family," *Pedagogical Seminary*, Vol. 32, pp. 416, 417.

represent, based on school and clinic examinations in several communities in the vicinity of New York City and St. Louis.

The distribution of mean intelligence quotients by size of family in the entire series of cases reported by Lentz is shown in Figure 44. It must be remembered that this distribution represents the combined influence of local, racial, social, and individual variations on the association between cultural-intellectual level and fertility in the American urban groups here represented.[11] It is likely that this series, including samples from several different communities and including clinic data, may have a somewhat greater variability than the urban population of the United States as a whole. This consideration may somewhat exaggerate the force of the relationship here indicated. The indications of large variations in familial fertility at the two extremes of the scale of intelligence, here indicated, are not supported by other studies, as we shall



Collected in Bridgeport. New York City. Englewood. St. Louis and vicinities by LENTZ: 4330 cases

Fig. 44. Distribution of Sizes of Family in Relation to Intelligence Quotients of Children in Series Described by Lentz. School and clinic data collected in Bridgeport, New York City, Englewood, St. Louis, and vicinities, 4,330 cases.

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[11] The unweighted average of the coefficients of correlation for twelve sub-groups (community samples) in Lentz's series is .226, whereas the corresponding coefficient for the whole series is .304.

see presently, although the general tendency here indicated is clearly in line with the findings of other investigators.

Lentz has computed from these data an arithmetic index of the influence of differential fertility among individual families on the expected distribution of intelligence quotients in two successive generations.[12] He finds indications of a tendency toward a change of 4.4 points in median intelligence quotients for two successive generations from differential fertility among individual urban families—whereas the corresponding change indicated by our analysis of differential fertility among occupational classes for the total United States was only 0.89 points. These two indices confirm one another in the sense of having the same direction. The difference in the force of the influence indicated may be due either to the somewhat unrepresentative character of Lentz's series, or to the consideration that only one set of variables (social class differences) is taken into account in our analysis, whereas other variations among individual families are taken into account in Lentz's procedure. Lentz's result might also be somewhat modified if the full force of differences in mortality rates, rather than merely the effects of infant mortality, were taken into account. Of course, no statistical exactness can be claimed for any indices of this sort. They have the advantage, however, of supplying a purely objective indication of tendencies at work in the American population.

There is some evidence that the general tendency toward a negative correlation between fertility and intelligence does not hold true within the extreme groups, either among the very gifted or among the mentally deficient. Studies of Harvard graduates by Woods, Wiggam, and Phillips and of Yale graduates by Huntington and Whitney, give suggestion of a positive correlation between "success" and fertility in these groups. Bolin and Holmes in a study of graduates of the University of California found no significant association between college grades and marriage frequencies. And Robinson's study of Swarthmore College alumnae also indicates the absence of any significant relation either between college grades and frequency of marriage or between college grades and fertility. Evidently there is little or no directly causal relationship between intellectuality as such and fertility. The usual negative relationship is probably an indirect one, mediated by variations in standards of living and other social conditions.[13]

Similarly, but due to quite different causes, the usual negative correlation between intelligence and fertility disappears, or becomes reversed, at the lower end of the intelligence scale. Imbeciles, as a group, are apparently relatively infertile. Popenoe, 1930, believes that male imbeciles in urban communities have little opportunity for effective propagation, and that female imbeciles probably do not differ very much in fertility from the general population. Among the low-grade feebleminded, absence of selfcontrol is counter-weighted, as regards reproductive tendency, by undesirability, sterility, and high death rates. The high reproduction rates characteristic of the high-grade feebleminded, borderline, and dull-normal groups are not found for low-grade imbeciles, still less for idiots.

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[12] *See* article by Lentz, for statement of method.

[13] *See below,* Chapter XII.

Furthermore, Thurstone and Jenkins have found that, in a large clinic series in Chicago, the families which are now producing imbeciles or idiots, with intelligence quotients below 40, are on the average only as large as families of children with average intelligence—whereas in the families producing high-grade and borderline mental defectives (intelligence quotients between 50 and 80) the number of children ever-born is about a third higher than among the families represented by children with average intelligence (*see* Table 69).

TABLE 69

Average Size of Families Classified According to Intelligence Quotients of Children Examined at the Institute for Juvenile Research, Chicago *

I.Q. of Child	Number of Families	Average Number of Children Ever-Born per Family
120 or over	32	3.13
110–119	65	3.37
100–109	130	3.62
90–99	249	3.78
80–89	312	3.90
70–79	350	4.42
60–69	301	4.72
50–59	154	4.82
40–49	91	4.03
Under 40	170	3.68

* Data from Thurstone and Jenkins, 1931, *Order of Birth, Parent-Age, and Intelligence,* p. 28. Reprinted by permission of University of Chicago Press.

Several studies have been reported which give results contrary to those usually reported concerning the relation of cultural-intellectual development to fertility, notably those by Willoughby, 1928 (a study at Palo Alto, California), Butt and Nelson, 1928 (a Utah study), Conrad and Jones, 1932, and Whetten, 1933 (studies in New England). In each of these studies an absence of any significant correlation between fertility and intelligence quotients (Willoughby, and Conrad and Jones) or between fertility and formal education (Butt and Nelson, and Whetten) is indicated for small, apparently homogeneous groups. The results of these studies may indicate the absence of differential fertility in relation to education or social status in some communities where special conditions have caused the maintenance of a high birth rate quite universally (as in Utah), or where fertility has fallen to a very low level (as among native whites in New England and in California). Conrad and Jones found some negative correlation between fertility and intelligence of parents of uncompleted families (with age of oldest child held constant) but no significant correlation between fertility and intelligence of parents in the case of completed families. Whetten found the usual negative correlation between schooling and fertility in a study of rural families in Connecticut; but after omitting all Catholics, foreign-born parents, and parents engaged in occupations other than farming, he found that the average number of children reported per family was practically identical (2.65 as compared with 2.64) for 57 parents with high school training or the equivalent and for 120 families with no schooling beyond the common grades. All of these studies suggest that differential fertility usually found in large diverse groups may not be found, under certain conditions, in more homogeneous groups.

6. *Conclusions*

The only groups in the United States which are at present reproducing at rates far above actual replacement needs are located in certain rural areas, and predominantly in communities that are at the lowest economic levels and most remote from those educational and cultural influences which are held typical of social progress in this country. And within the towns and cities, the lower occupational groups, especially those in marginal economic circumstances, and dependent groups, characterized by low ratings as regards cultural-intellectual development, are commonly found to have birth rates somewhat above replacement needs and far above the birth rates characteristic of neighboring groups with superior advantages. At the same time there is hardly a single urban group in which the majority of the young people enjoy the advantages of high school education and in which many continue their education through college that is now replacing itself from one generation to another.

We have noted that the cultural-intellectual development of one generation constitutes the social background which very largely determines the intellectual status of the next generation.

A negative association between fertility and cultural-intellectual levels is manifest (1) among regional groups, (2) among social groups, and (3) in general, among individual families within broad social groups. Such an association, however, is not found in comparisons between large race or nationality groups in the United States at present, although some minor racial groups that are not yet well adapted to ways of living in this country show very high fertility rates.

By comparing reproduction rates with average ratings on cultural-intellectual development for regional groups, occupational class, and individual families, we have been able to get some idea of the strength of this force, which in its direction is definitely opposite to conscious educational and social efforts.

We have repeatedly stated that, in so far as this influence concerns social heritage only, it may be counteracted by enormous efforts, along economic, educational, and other lines of social advance. Moreover, we shall find clear evidence in other investigations (*see* Chapters XII and XIII) that an intensification of educational and social efforts designed to raise standards of living and cultural-intellectual levels among groups that are now severely handicapped may be the most effective means of combating this situation. But at present the negative association between fertility and cultural-intellectual level in the population of the United States reveals a powerful force that is working against our most cherished national ideals and that threatens to defeat the aims of the whole public education movement. If this force remains unchecked, its eventual political and social repercussions may be tremendous.

CHAPTER X

BIOLOGICAL SIGNIFICANCE OF GROUP DIFFERENTIALS

1. *Statement of Problem and Methods of Approach*

Up to this point the materials presented in this book have been based on measurable differences between different groups, or between children derived from different groups. We have already seen in the previous chapter that group variations in reproduction rates in relation to variations in cultural-intellectual levels raise serious problems, purely from the standpoint of their significance for the social heritage of the nation.[1] In so far as such differences in cultural levels may reflect differences in hereditary capacities, the problems suggested may be even more serious from a long-range point of view. In this chapter we will take up this question of differences between groups in the genetic basis of intelligence. We do so with the warning that many of the issues are still confused and obscure. Every effort will be made to avoid emotional bias which has so often led to mistaken conclusions in this field.

Intelligence tests are the best means of measuring "intelligence." But the structure of human intelligence is, in origin, partly biological and partly social.[2] The intelligence test is a social instrument. It can, therefore, reveal variations in hereditary capacities only indirectly, and only in so far as the influence of environmental factors on variations in intelligence can be experimentally controlled or objectively measured. The important scientific studies on the rôles of hereditary and environmental factors in mental development have been reviewed by Schwesinger, 1933, in *Heredity and Environment.* The facts established by these studies do not, by any means, support an a priori expectation of equality among divers groups; but they do prove that *gross differences in intelligence test ratings for groups with quite different backgrounds cannot be accepted as having any significance with regard to hereditary capacities.*

Various more or less systematic approaches are possible in studying the hereditary capacities of particular groups, apart from the environmental influences to which they have been subject.

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[1] The reasons for devoting this chapter entirely to the study of genetic factors affecting intelligence, to the exclusion of factors affecting physical development and affecting health, have been given in Chapter V.

[2] One of the present writers in a previous study has treated the rôle of symbolic processes, which are social in their origin, in the development of reasoning. *See* Lorimer, 1929, *The Growth of Reason; A Study of the Rôle of Verbal Activity in the Growth of the Structure of the Human Mind.*

The whole subject of the respective rôles of heredity and environment in psychological development is reviewed in a recent volume, edited by the other of the two present writers: Schwesinger, 1933, Osborn, Editor, *Heredity and Environment; Studies in the Genesis of Psychological Characteristics.*

(1) It is possible that, eventually, when more is known about different factors in intelligence, the analytical treatment of the performance of different groups on different types of tests may give results that will have genetic significance. Some analyses of this sort have already been carried out, comparing the performance of different groups on verbal, numerical, and spatial materials, in rote memory, in analogies, in scores for errors, and in scores for speed, and so forth.[3] But the results of such studies are not usually presented as authoritative by their authors, and cannot properly be so regarded in the present state of our knowledge about factors in intelligence.

(2) Historical studies of the earlier migrations of various groups and controlled analysis of selective factors in recent migrations may throw light on the interpretation of present levels of cultural-intellectual development in some groups. However, critical studies of selective factors in migration clearly show that variations in individual qualities usually play a relatively minor rôle in local migrations, so that this approach must be used with great caution.

(3) It is sometimes supposed that variations in the frequency of apparently brilliant individuals or of apparent mental defectives affords a better indication of hereditary variations in intellectual capacities than differences in average level of intelligence. This may or may not be so. The effect of depressing environmental conditions in causing individuals who might otherwise be classed as "dull-normal" to appear as "feebleminded" makes an exact use of this criterion impossible. The same logic applies to the possible effect of intensive education, begun in the home or in the nursery school, on transferring bright individuals who might otherwise be classed as "superior" into the class of the "very superior." The environmental status of most individuals diagnosed either as psychotic or as mentally deficient in the army statistics is so bad that much allowance must be made for the possible bad effects on developing mental life—although, of course, parental mental deficiency may have played a part originally in creating such unfavorable social conditions [4] (*see* Appendix O). Thus data of this sort, although perhaps not wholly without biological significance, cannot be expected to yield conclusive results.

(4) Partial control of hereditary or environmental variables is possible in several different ways. For example, groups of similar racial origin can be studied in different situations—but the difficulty here is the uncertainty as to whether or not selective factors may have operated with different effects on the groups living in different situations. Similarly, individuals with different types of racial admixture living in similar environments can be compared, as in studies of the relation of intelligence to skin color, alleged

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[3] *See* studies by Dunlap, Jones, Kelley, Klineberg, and others.

[4] It is interesting to note, incidentally that, according to the army data but contrary to general impression, psychoses occur more frequently among persons with little education than in the population at large. A similar contrast is even more marked with regard to epilepsy (*see* Appendix O).

ancestry, or other racial indices among colored groups in any locality—but the difficulty here is that special opportunities or attitudes may have been associated with such variations in racial origin or in physical racial traits. In short, the difficulty with all such partial control of the important variables is simply that it is always impossible exactly to appraise the influence of the elements that are left uncontrolled.

All the methods listed above may be described, in their present development, as *incomplete* approaches to the study of group variations in heredity. Each of these methods may be employed, to a certain point, critically and objectively. But such application always stops short of conclusive results, and the evidence always remains ambiguous and subject to controversial interpretation.

(5) The only studies that are wholly satisfactory, from the scientific standpoint, are studies in which the operation of environmental variables can be absolutely isolated from association with hereditary factors, or in which the operation of genetic variations can be absolutely isolated from association with variations in environmental situations. Studies of identical twins reared apart offer an ideal illustration of such isolation of environmental from hereditary variations—in this case, with the heredity held constant and the environment varied. But no studies of this particular type are available which throw any clear light on the interpretation of group differences in intellectual development. An isolation of hereditary factors, with environment held constant, has been effected in three sets of data bearing on the interpretation of variations in intelligence among social groups. In each of these three cases, children of significantly different origin, as regards social status of parents, were placed before one year of age in similar home situations. And the results obtained from these independent studies appear to be quite consistent. We will, therefore, give special attention to these materials (*see* Section 4, this chapter). On the other hand, in studying the possibility of hereditary variations in intellectual capacity among regional and racial groups in this country we are thrown back entirely on the first four methods listed above, all of which leave room for a good deal of inconclusive subjective interpretation.

We will mention briefly a few *general considerations* which may serve to reinforce in the reader's mind the complexity of the problem with which we are concerned. Then we will turn to an examination of particular data bearing on the hereditary capacities of particular groups, as regards intelligence.

(1) High correlations are commonly found, for homogeneous groups, between scores on well-standardized verbal tests and progress in school work. Lower correlations (often with Pearson product-moment coefficients in the vicinity of .4) are commonly found, for similar groups, between scores on batteries of good verbal tests and scores on batteries of good performance tests. Also, much lower correlations are usually obtained between intelli-

gence test scores and efficiency ratings in business than between intelligence test scores and school grades.[5] These simple facts, together with the results of extensive mathematical analysis of the relationship between different groups of items in intelligence test batteries, suggest that particular tests measure particular aspects of intelligence, and that social conditions which affect the acquisition of symbolic processes (involved in the treatment of verbal and numerical materials) may have profound influence on ability to handle the sort of problems met in the classroom and the sort of intelligence test items that do hang together well and so are commonly accepted as the most valid tests of "intelligence."[6]

(2) A different consideration is suggested in an illuminating statement by Peterson, in "Methods of Investigating Comparative Abilities in Races":

> "The experience of the testees is a large factor in determining their scores on all group tests, whether verbal or non-verbal. This has been found true even of the Dodd International (Rotator) Tests of Mental Ability, which do not require the use of pencils and are strictly non-verbal . . .
>
> "Individuals are moved not only by present contacts and stimuli as are mere physical objects, but they gradually build up 'sets,' or attitudes (ideals, in subjective terminology) from contact with many situations whose effects are somehow carried over and become organized into more or less permanent tendencies of the kind mentioned. A set for working as rapidly as possible for a given period of time at a high degree of accuracy is a thing that does not result merely from instructions and a few exercises given just before a test; it is built up gradually by means of various competitive exercises, reports on the accomplishment of others as compared with one's own record, praise and rewards, and other kinds of stimulation by members of the group. Physiologically a persistent attitude of this kind is probably to be accounted for by the constant inter-stimulation of various intra-organic processes, different parts of which become excited by various environmental factors certain elements of which in the past have been potent in their arousal. At any rate, we have clear evidence that in certain backward localities and school systems, and under certain social conditions imposing restraints of various sorts on progress, 'sets for efficiency' are not built up to the extent that they are elsewhere" (pp. 178–179).

(3) In general, the studies reviewed in *Heredity and Environment* tend to show the importance, among the environmental factors affecting intellectual development, of social-cultural conditions, in contrast to physical conditions, especially in the case of groups with very different environmental backgrounds.

> "Of the two sets of influences which have been examined for effect on test intelligence, namely, social-cultural and physical factors, the evidence weighs more in the direction of the former and less in the direction of the latter, than uniformed preconceptions would have led us to believe.
>
> "Of the beneficent culture influences listed on the previous page, evidence

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[5] *See* treatment of these topics by Pintner, 1931, and by Schwesinger, 1933, Chapter I.

[6] *See* the statistical studies by Thorndike, Spearman, Kelley, Schneck, Brigham, Smith, and others, and the treatment of the rôle of language activity in the development of children's thinking by Stern, Piaget, Delacroix, and Lorimer. On the relationship between these two types of investigation, *see* Brigham, 1932.

> has accrued to indicate the positive importance of good cultural environment of the home, urban residence and some inconclusive evidence in favor of nursery school attendance. Retarding influences were found associated with bilingualism in the home, and rural residence. But whether in the direction of heightening or of lowering the I.Q. certain conditions must be met before the above influences can become effective. These conditions are: (1) That the difference in cultural backgrounds of the home must be extreme (as compared with the "average" American home); (2) that cultural change, if any, be introduced at a very early age; and (3) that change to the new environment, whether home or resident nursery school or geographic residence, be maintained over a long time in the developmental period" (p. 337).

We will review briefly the different kinds of material now available that seem to bear most directly on the study of possible variations in hereditary capacity for intellectual development among groups in each of the three categories that have been used throughout this work: regional groups, racial groups, and social groups. Finally, in Section 5, we will deal with the question of the efficacy of selection for genetic traits on the basis of apparent (*phenotypic*) characteristics.

2. *Regional Groups*

In the analysis of data on frequencies of mental deficiency among native whites in different parts of the United States we were led to the conclusion that rural areas in the Eastern United States characterized by poor lands and long-continued out-migrations show high frequencies of mental deficiency. High frequencies of mental deficiency were found in Northern New England, especially Vermont and the Maine coast, and in various sections of the South, especially in more or less isolated coastal and mountain areas, and in scattered areas in the Middle Atlantic and East North Central states. These are, for the most part, areas which have suffered extensive emigration and which have been characterized by stationary or declining economic systems. In contrast, very low frequencies in mental deficiency were found for even more sparsely populated rural areas in Montana, Idaho, Wyoming, Arizona, Utah, and Nevada.

The extent to which in 1860 and 1900 the white populations of various states (admitted before 1860) were composed of persons born and brought up in these states is shown on the left in Figure 45. The percentage of living white persons born in each state who were found in 1860 and in 1900 to have migrated into other areas is shown on the right in the same diagram.[7] As it happens, none of the states listed above as characterized by peculiarly low frequencies of mental deficiency are reported in this diagram, because these are all states admitted since 1860.

Some association between migration history and frequency of mental deficiency in different sections is apparent. There are some important exceptions, which we shall mention shortly; and it is, of course, possible that the environmental stimulus of movement into new areas may have had a

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[7] The percentages for 1860 are based on figures for all free persons.

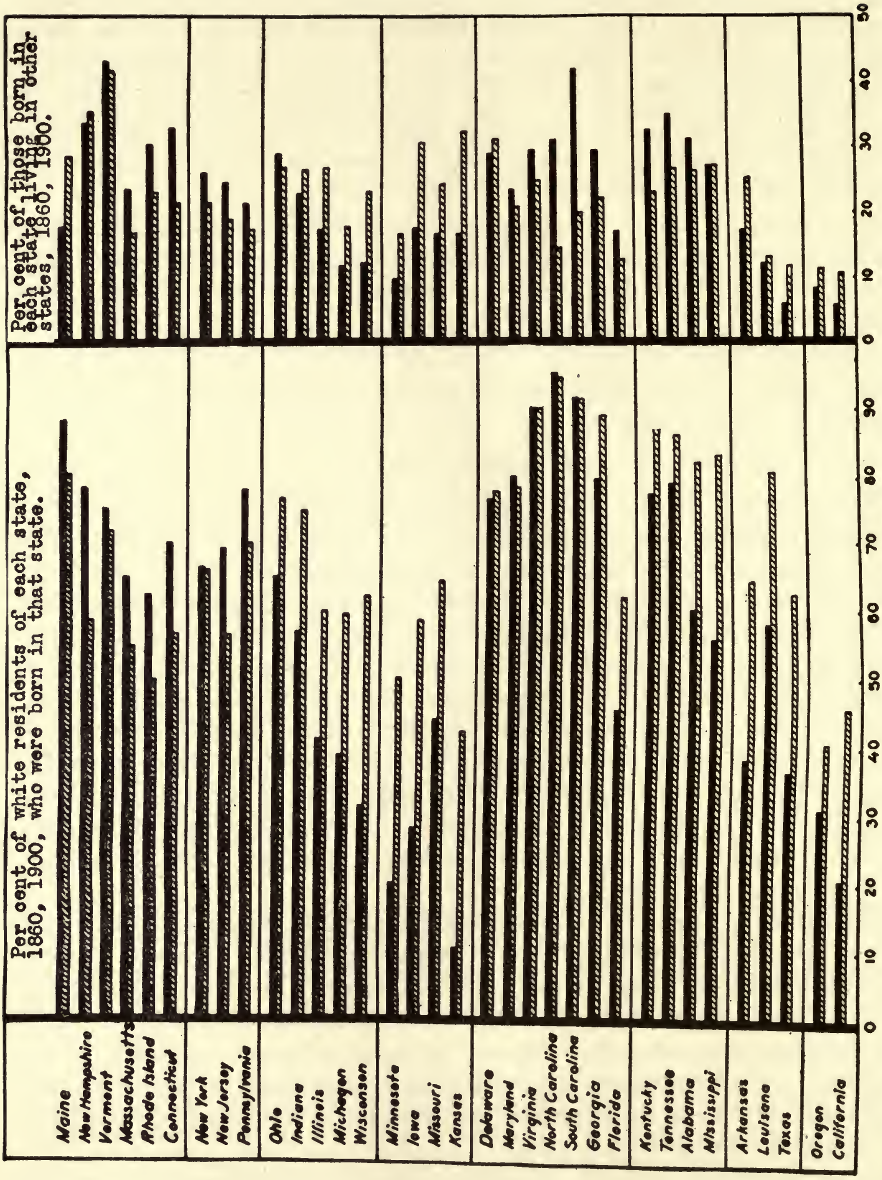

FIG. 45. INDICES OF IN- AND OUT-MIGRATION FOR STATE POPULATIONS, 1860, 1900.

quickening effect on mental life. The association between these items does, however, strongly suggest that families that have remained for several generations in areas of low economic productivity, in spite of the constant appeal of new opportunities elsewhere, may include a disproportionate number of persons of inferior capacity for intellectual development.

Perhaps the most important exception to this association appears in the Southern Appalachian area. This region is characterized, as regards the isolated upland counties, by a low level of cultural-intellectual development and high frequencies of apparent mental deficiency. There is clear historical evidence that this area was originally settled primarily by Scotch, English, and German stocks, the first-mentioned by way of North Ireland for the most part, the so-called "Scotch-Irish." Many of the ancestors of the present Southern Highlanders apparently came quite directly through Pennsylvania into this region, and until quite recently there has been relatively little emigration because the families in the narrow mountain valleys have been too much cut off from the rest of the nation to sense the appeal of other opportunities. And in large part these families have been contented in their mountain homes (*see* Campbell, 1921). It seems likely, therefore, that the low level of intellectual development and the rather high frequency of apparent mental deficiency in this region should be attributed primarily to environmental effects.[8]

There has been, however, some tendency for unsuccessful families to retreat from the lowlands into the hills and there to maintain a rather miserable existence. A community derived from such families is typified in "Colvin Hollow" (*see* Sherman and Henry, 1933, pp. 10–17).[9] Apparently a crucial period in the declining economic life of this community came near the beginning of the present century. "The more energetic began to desert the log huts and migrate to other parts of the state. A few were able to establish themselves and quickly forgot their mountain associations. Many failed and returned." Such scattered retreats and migrations may have had some influence on the quality of the population in some portions of the Appalachian area, especially in the case of some of the less isolated counties, as, for example, Madison County, Virginia, in which the particular study mentioned above was carried out. This consideration, however, can have little force with reference to the most isolated portions of the Cumberland plateau where the developmental level seems to be equally low.

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[8] According to modern genetic principles there is no reason to suppose that inbreeding among good stocks would cause a high frequency of mental deficiency. In so far as inbreeding affects intelligence in isolated regions it would be expected to cause the appearance of greater variation between communities because of some more or less "pure strains" of very superior lines in some localities and of very inferior lines in other localities. It should be noted that the expression "pure strains" is used here in a loose, not in a strictly technical, sense. There are no "pure" human stocks, in a genetic sense.

[9] These authors incline to the thesis that the low development of this community may be attributed to the three miles of poorly kept roadway separating these families from their neighbors. It is equally possible, however, that the poor road may be an effect rather than, or as well as, a cause of the poor condition of the community.

The reader will also remember that there is evidence in the army medical statistics of high incidence of some hereditary physical defects in various mountain and coastal areas in the East (Chapter V). Danielson and Davenport, Miller, and others have traced family histories in some communities of this type, showing high frequency both of mental and of physical defects in successive generations.[10] Rural areas of marginal economic productivity, within fairly easy reach of more prosperous regions, are, it seems, frequently occupied by groups with high fertility and with a disproportionate number of persons who are handicapped in hereditary capacity. It must be understood that this generalization is meant to apply to scattered communities in restricted areas, not to the general population in the older agricultural portions of the country.

There has been a good deal of controversy about the character of the early settlers in the American Colonies, especially with regard to the settlers in Virginia and some of the other Southern colonies. Both the eulogistic descriptions of these early colonists and the derogatory characterizations by some historians, for example, Fiske, and Lodge, are generally repudiated by critical modern historians. It appears that a considerable number of persons entering as "indentured servants" were included among the early residents in all the American Colonies, but especially in Virginia, Maryland, and surrounding regions. These were persons who sold their services for a limited term, generally about four years, to provide their own passage money or the transportation of persons who were dependent upon them. "To Virginia alone there came annually from fifteen hundred to two thousand [such persons] in the years from 1635 to 1705, making a total for these seven decades of from 100,000 to 140,000" (Wertenbaker, pp. 25–26). The men and women who availed themselves of indenture to better their fortunes in the New World were for the most part neither menials nor criminals. The bulk were poor laborers who were no longer content to work in misery in England while opportunity beckoned from across the Atlantic. But the operation of the extremely harsh Poor Laws directed against beggars, vagabonds, debtors, unemployed persons, and others in straitened circumstances in England during this time were undoubtedly effective in "persuading" many to avail themselves of the opportunity thus afforded. It is clear that among those who entered the Colonies under some form of contract there were many "men of sturdy mind and sturdy body." Many of them rose rapidly in the New World. Wertenbaker has shown that a goodly proportion of the burgesses in the early assemblies of Virginia had originally entered the Colonies under contract. There was, however, also ample room for the inclusion of a large proportion of persons who may have been handicapped in hereditary capacities.

By no means all the yeomen even in Virginia and Maryland were recruited from the ranks of freed men. Many came from England paying their own fare and that of their wives and children. "From these two sources, from the servants who had completed their terms, and from the free immigrants of small means, there was built up in Virginia and Maryland a yeomanry which constituted the main strength of those colonies" (Wertenbaker, p. 34). This yeomanry was destroyed by the introduction of Negro slaves. The "poor whites" of the South are primarily an economic group, the offspring of the displaced free laborers and white servants of the early Colonial period. It is impossible to know to what extent they may include families of limited hereditary capacity. The families derived from the white laborers of Maryland and Virginia, as their places were taken by Negro slaves, spread into other colonies, mingling with new immigrants from England, Scotland, Ireland, and Germany—the newer stocks often predominating numerically.[11] Gradually, the immigration stream shifted northward. The South was scarcely touched by the new immigrant forces that throughout the Nineteenth Century joined in the main stream of westward and urban expansion. Except for rather scattered migrants from Northern states, and Scotch-Irish and German settlers in the Carolinas and the Appalachians, the white population of the Old South is almost wholly derived from Colonial Anglo-Saxon ancestry. At the same time the South, as we have noted, has contributed heavily to the population of Northern and Western states. The New England, Middle Atlantic, and East North Central states were also marked by extensive out-migration during the Nineteenth Century, although most of these regions, especially in the cities, received large numbers of immigrants at different periods. Old Colonial and early immigrant stocks predominate strongly in many rural sections in the Northeastern states, especially in Northern New England and in Indiana. The population growth of these areas has been checked by heavy emigration to cities and the West.

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[10] Of the two studies specifically cited above, the second, Miller, 1931, gives follow-up results for the "Hill folk" originally studied by Danielson and Davenport, 1912.

There is little or no reliable information on possible selective factors in internal migrations during the Nineteenth Century, and only a few careful studies on recent tendencies. The available evidence from recent studies of rural-urban migration tends to support a few broad principles, which may be summarized, as follows:

1. All studies indicate that under normal conditions "chance factors," such as position in family and vicissitudes of personal fortune, play an important rôle in determining which individuals in any community will migrate to other localities. "Selective factors," dependent on inability to succeed at home or on education, intelligence, and initiative to appreciate greater opportunities elsewhere, usually play a minor rôle, but under some circumstances may exercise a profound influence.

2. On the basis of studies by Zimmerman and associates in Minnesota, corroborated by Lively and Beck for Ohio, and by Gee for a Piedmont community in South Carolina, it appears that in areas characterized by a

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[11] *See*, for example, Hobbs, *North Carolina, Economic and Social*, pp. 50–55.

fair degree of rural prosperity, "the cities attract the extreme while the farms attract and hold the mean strata in society."[12] This principle is described by Sorokin and Zimmerman, 1929, as "the net law of rural-urban social selection" (p. 574).

3. There is a strong a priori probability and some evidence that rural areas of declining prosperity may lose a disproportionate number of the most intelligent offspring through out-migrations. A counter-tendency is exercised by personal attachment to place and community so that some superior families remain in places where economic rewards are small.

Selective emigration of superior individuals is suggested as a possibility in the Eugenics Survey of Vermont and is definitely indicated in a study of migration from certain Tidewater counties in Virginia. We will present the results of the latter study in some detail. There are ten counties in Virginia in which the total population was less in 1920 than in 1790—not counting decreases due to boundary revisions. Here we have a region that has suffered extensive out-migration, more than sufficient to balance natural increase. The characteristics of migrants as compared with non-migrants among families in these ten counties have been studied by Gee and Corson, of the Institute for Research in the Social Sciences, University of Virginia (1929). Data were collected in 1927–1928 regarding 3,376 individuals, 1,910 white, and 1,466 colored, in a total of 352 families. "The 352 families included were selected from the different social levels. While any such classification at best must be a very arbitrary one, as far as possible, equal numbers of families were chosen from the upper, middle and lower social classes, and these families were selected in each case upon the advice of leading citizens of the county . . . Likewise the sample was weighted so as to include families from owner-operated farms and tenant farms of both races" (p. 19). "The method of selection of the sample makes it include a group that is above the average level of the population of the area, although there are represented all of the social classes, both white and black. It is the opinion of the authors that the sample selected and the phenomena set forth give a fair picture of the rural depopulation problem in the area under study" (p. 100).

The historical background of the situation in these counties, chiefly tidewater areas, may be indicated by a few quotations:

> "In 1612, the cultivation of the plant [tobacco] in small patches began among the colonists, but grew apace as the demand existed in England 'for only two years after the experiment of 1612, the amount used entailed a national outlay of two hundred thousand pounds sterling.' This product well supplied the economic demand for an exchange medium between the colonists and the old world. Within a comparatively short period of time, as a result of the tobacco trade, fortunes began to accumulate in the colony. Among the more progressive

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[12] The qualification stated here was, at first, clearly enunciated by Zimmerman and his research associates in the Minnesota studies. It is somewhat obscured in later writings by Sorokin and Zimmerman.

> and fortunate classes, an order of village and plantation social life came to prevail which rivaled that of the English gentry, and has made picturesque and colorful to this day the literature descriptive of that period . . . Authorities agree that at the time of the first census in 1790, the Tidewater counties were in such a state of soil depletion that the older points of shipment in that section were rapidly declining, and steps were already being taken to improve both the Potomac and James riverways into the interior areas so that the burden of long shipment might be lightened from these new sources of production. . . .
>
> "A few of the causes for the situation presented by these population figures have been alluded to, but there are several others which have had effects that perhaps are even more potent. Principal among these was the plantation system which flourished more in this section than almost anywhere else and which had in it certain inherent weaknesses that in the stress of later years led to its disintegration. . . .
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> "Another factor which has added to the difficulties of these counties is that of the transportation facilities. The Tidewater counties were especially favored in their youth by available water transportation afforded by the James, the York and the Rappahannock rivers. . . . Railroads were not encouraged by this region, for Tidewater Virginia, having made some progress in general farming and special crops for Northern markets, was satisfied with her navigable water outlets and feared the competition which a western railroad connection might give" (pp. 5–17).

In contrast to the Minnesota and Ohio series, in which the proportion of migrants was much heavier among farm tenants than among farm owners, somewhat smaller proportions of migrants are found here among tenants, especially in the case of white tenants.

TABLE 70

Migration from Farms Operated by Owners and Farms Operated by Tenants, Tidewater Counties, Virginia *

	Individuals Reported	Number of Migrants	Migrants per 100 Persons
White owner families	1,423	557	39
White tenant families	480	137	28
Negro owner families	738	300	41
Negro tenant families	735	280	38

* Data from Gee and Corson, 1929, *Rural Depopulation in Certain Tidewater and Piedmont Areas of Virginia*, pp. 27–28.

The authors comment thus: "What is the explanation of this seeming contradiction to the general findings of the majority of studies on this subject? The explanation is that in Tidewater Virginia there is perhaps a very different class of tenant family than is found in the other states studied. Most of the tenants are share croppers, the cash tenant is an exception to the rule. The tenants are very largely dependent on the farm owners for everything from advice to food and shelter. The educational level of the groups is low. They are unintelligent, illiterate, bound to the land by the shackles of tradition and by their inherent inertia" (pp. 27–28). It is possible that in the case of Negroes the acquisition of property holdings, even if very meager, may operate somewhat more effectively to hold such owners in rural life in view of the precarious nature of urban occupational adjustments for Negroes.

The proportion of migrants (male and female) at different sizes of farm (owner-operated and tenant-operated) does not show any significant variations in this study, although in other studies the heaviest migration is usually found from families on the smallest farms.

TABLE 71

MIGRATION IN RELATION TO SIZE OF FARM, TIDEWATER COUNTIES, VIRGINIA *

	Individuals Reported	Number of Migrants	Migrants per 100 Persons
White Families by Number of Farm Acres			
0–50	129	47	36
51–100	323	114	35
101–250	804	299	36
251–500	436	165	38
501 and over	208	69	33
Total	1,910	694	36
Negro Families by Number of Farm Acres			
0–50	890	367	41
51–100	347	126	36
101–250	174	64	37
251–500	43	17	40
501 and over	12	6	50
Total	1,466	580	39

* Data from Gee and Corson, 1929, *Rural Depopulation in Certain Tidewater and Piedmont Areas of Virginia*, pp. 29–30.

In the case of whites, the proportion of migrants (male and female) is highest (over 50 per cent) among those with advanced education beyond the high school level, and lowest (about 35 per cent) among those who did not finish grade schooling. It is quite possible that the smaller proportion of migrants among those who have attended high school (40 per cent) in contrast to the proportion among those with more advanced education (55 per cent) is due to added courses by migrants in preparation for urban residence. The difference between those who completed grade schooling (migrants, 46, 40, or 55 per cent) and those who did not do so (migrants, 35, or 34 per cent) probably points to some difference in social origins between migrants and non-migrants (*see* Table 72). The corresponding variations are smaller and perhaps less significant in the case of the Negro groups.[13]

Obviously, no rapid change is indicated in the character of the white population of these Virginia counties with discouraging economic outlook. Nevertheless, there is a very definite indication here, which is not found in the studies of migration by Zimmerman and associates in Minnesota or

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[13] Other data on Negro migrations will be given in the next section, this chapter.

TABLE 72

Migration from Farms in Relation to Education, Tidewater Counties, Virginia *

	Number of Individuals Reported	Number of Migrants	Migrants per 100 Persons
Whites, by Highest Grade Attained			
4th grade and under	167	58	35
5th or 6th grade	293	99	34
7th grade	380	173	46
High school	481	192	40
Business school, training school or college	315	174	55
Total number of cases for whom educational status is reported	1,636	696	43
Negroes, by Highest Grade Attained			
4th grade and under	770	330	43
5th or 6th grade	249	111	48
7th grade	112	69	62
High school	68	38	56
Business school, training school or college	54	30	56
Total number of cases for whom educational status is reported	1,253	578	46

* Data from Gee and Corson, 1929, *Rural Depopulation in Certain Tidewater and Piedmont Areas of Virginia*, pp. 68–75.

by Lively and Beck in Ohio, of a trend toward accumulation of families with limited advantages and perhaps with limited hereditary resources.[14] Over a long period of time (e.g., four generations) a slow selective process of this sort may have had a very considerable effect on the character of the remaining population. This tendency may possibly have been heightened by the effects of differential fertility during part of this period.

A critical study by Baldwin, Fillmore, and Hadley of farm and city children in Iowa, on the basis of performance on specific intelligence test items and variations in scores at different ages, led to the conclusion that the small difference between farm and city children in favor of the latter, as regards gross intelligence ratings, should be attributed to environmental factors. This is what we would expect in the light of studies of selective migration in similar areas, e.g., the Minnesota studies by Zimmerman and associates, and the Ohio studies by Lively and Beck.

The only extensive and critical analysis of the intelligence test performance of a large rural group in an area where agricultural conditions have been discouraging for a long time is that by Harold E. Jones and associates, under the auspices of the Columbia University Social Science Research Council, in several Northern New England villages.[15] The performance of 351 school children, aged 3–13 years, in this rural population is compared on different items in the Stanford-Binet intelligence test with the performance of the 921 urban children (largely drawn from progressive Western cities) used in the original standardization of this test, and with that of 212 private school children of superior social status. Performance tests were also used with the children in the rural sample, and Army Alpha examination results were obtained for a majority of their fathers and mothers. In gross I.Q. ratings, the differences between these groups are large, and in the expected direction —the mean I.Q.'s being 93.4±.5 for the "rural" group, 101.5.±.3 for the "urban" group, and 116.9 for the "superior" group.

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[14] It is interesting to note that Gee and Runk, 1931, reported similar results from a study conducted along somewhat different lines in Albemarle County, Virginia; but Gee, 1933, reported an entirely different situation, more like that found by Zimmerman and associates in Minnesota, in a study of a rural community in the Carolina Piedmont, using the same procedure as that used in the Albemarle study. In Albemarle County a strong association was found between social status and migration to cities, but such an association was not found in the Carolina Piedmont.

Tentative findings in studies of migration in rural areas in the vicinity of New York City by Klineberg and associates, using the technique developed in studies of Negro migrations from the South, indicate the absence of selective factors in these areas.

In all three digits tests (repeating series of unrelated numbers, directly or reversely) the "urban" group is significantly superior to the "rural" group, but the difference between the "urban" group and the "superior" group is much smaller, although the latter appears slightly superior in each case.[16] The authors comment on this finding, as follows (Jones *et al.*, p. 90):

> "This may have at least two interpretations, that (1) individual differences in the environment bear a curvilinear relation to differences in the digit test; beyond a certain point increments in environmental opportunity fail to register, at any given age, in improved performance; (2) the digits tests, in the form in which they are presented, are relatively free from differential environmental effects, but their validity as measures of intelligence is restricted to the lower half of the I.Q. distribution. In view of the nature of the tests, the second of these interpretations may carry greater weight."

Conversely, little difference is found between the "rural" and "urban" groups, but large differences appear between the "urban" and the "superior" groups in definitions, weight discrimination, and fables (the difference in each case being three to four times its standard error, in the comparison between the two city groups), making change (the corresponding difference in this case being twice its standard error), and absurdities (the corresponding difference in this case being five times its standard error).[17] "In the case of the test of weight discrimination," it is suggested, "it is possible to argue that the practical training of the rural child gives him a special advantage, as compared with a normal urban sample, but that *within* an urban sample the tests are able to show an adequate degree of differentiation. This may be true, to some extent, of other tests in this group" (p. 91). On the other hand, it might be argued, perhaps with equal cogency, that in definitions, absurdities, and fables the linguistic skill acquired by children in homes of superior cultural level is given full scope, whereas no difference of any sort is indicated between representative rural and representative urban groups. The ambiguity adhering to the results obtained by this method, mentioned in the opening paragraphs above, again becomes painfully apparent—in spite of the very real interest which such an analytical approach awakens.

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[15] Several reports have been published on various aspects of this study. The materials used here are taken from an article by Jones, Conrad, and Blanchard, 1932.

[16] A similar relationship between the three groups appears in the case of the ball and field and date tests.

[17] In estimating group differences, these authors used "average difference indices," computed from lines fitted to a series of points representing difference indices between groups at specified ages for each test, each difference being expressed in terms of its standard error. The values listed above are the values indicated by this procedure (*see op. cit.*, p. 68).

The treatment given by Jones and his associates to variations between these groups in performance on other tests in cases where differences are more pronounced at some age levels than at other age levels and the comparison of results obtained with verbal tests and with performance tests lead into further complications.[18] These writers summarize their interpretations of the whole study with reference to the influence of hereditary and environmental factors affecting intelligence test performance in this area as follows:

> "In summary, then, it is inferred that a rural child moving to the city would increase his intelligence test scores, merely as a result of changed environmental conditions. The environmental handicap of the rural child is derived chiefly from specific limitations in the material environment, and from social differences which achieve expression in linguistic information and skill, in the speed of test performance, and in adaptation to test situations. The handicap is specific, not general; depending on the test items, it is sometimes transitory but more often cumulative; the cumulative effect is sometimes in the direction of diminution, sometimes in the direction of increase of handicap. It is unsafe, however, to infer that the *average* retardation of rural children is chiefly due to environmental factors. The quantitative relations cannot be stated on the basis of the present evidence, but the most likely estimate would be that about half of the average difference of ten points IQ [between the Northern New England rural and the representative urban (Stanford standardization) population] is attributable to factors other than those derived from the social and educational environment. Certainly within a rural or urban group, the validity of the IQ in measuring native differences is dependent upon the social and educational homogeneity of the group. For whether or not the IQ itself is constant, it is fairly clear that its meaning is inconstant; as ages change, and as the homogeneity of groups changes, individual differences in IQ will represent changing degrees of relative hereditary and environmental influences. Nature-nurture inquiries of a fundamental character can in the future be conducted more profitably on the basis of specific tests, rather than on the general composites represented in IQ or MA" (pp. 96-97).

This conclusion is, of course, a purely subjective estimate; but it commands respect by virtue of the quantitative data and critical analysis on which it is based. The value of such a generalization, in any case, is limited to the specific situation to which it is referred. It cannot, of course, be applied generally to rural-urban differences in test performance. The environmental handicaps of children in Vermont villages are not at all of the same order as the environmental handicaps of children in the Southern Highlands, rural Negroes, reservation Indians, or immigrants from Italy. In fact, Bagley's data on school efficiency for the period 1880 to 1910 show Vermont as sixth from the top in a list of twenty-six states.[19]

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[18] "Tests showing urban-rural divergence are more frequent in the upper age levels. It is inferred, however, that this is due to inequalities in the scale, rather than to general tendencies in mental growth" (*op. cit.*, p. 95).

We have presented, in the preceding paragraphs, the results of those studies which seem to bear most directly on the possibility of differences in hereditary capacities between various regional groups in the United States. None of the methods, at least separately considered, yields conclusive evidence. In the opinion of the present writers the following tentative conclusions seem most reasonable.

1. There are some scattered rural communities in which hereditary factors unfavorable to intellectual development, resulting from selective population processes, are the primary cause of low cultural-intellectual level and high frequency of mental deficiency. Such communities are typically located in barren coastal, mountain, or brush lands, in the older (Eastern) states, isolated enough to constitute fairly "closed communities" but in sufficient contact with more progressive areas to make emigration easy and natural for superior individuals. Such communities demand attention, but they constitute a small element in the total population of the nation.

2. Among large regional groups, in the United States, differences in economic and other environmental factors, such as climate, education, and so forth, may be sufficient to explain cultural-intellectual differences without recourse to genetic explanation.[20] There is no conclusive evidence on this point.

3. In general, where there appear to be any variations in hereditary capacities among regional groups, these seem to be positively, rather than negatively, correlated with apparent differences in cultural-intellectual development.

Present inferential evidence about the genetic capacities of large regional groups in the American population appears inadequate as a foundation for the formation of far-reaching population policies. But it does appear that, in general, conclusions regarding population policy, defined with reference to social heritage, are strengthened rather than weakened by consideration of possible variations in genetic capacities. Improvement of living conditions in areas of retarded development is urgently needed, with more comprehensive scientific studies of the peoples in these areas, and with attention to possible selection processes in rural-urban migrations.

3. *Racial Groups*

There is little to be added, at this point, to the data already presented concerning differences in intellectual development among various national groups from European countries. We have seen that fairly marked differences in central tendency can be traced between certain groups, e.g., Southern Italians, and certain other groups, e.g., English, Scandinavians, or Jews. There is evidence that in some cases similar contrasts are found in the European setting and among residents in this country in the second and third generations. These differences also have a fairly consistent relation to frequencies of mentally deficient persons, on the one hand, and to frequencies of gifted individuals on the other. These results cannot be attributed merely to foreign-language handicaps in test performance, nor to regional isolation, because the observed contrasts cut across variations in these conditions. On the other hand, there is no evidence that these contrasts are due to biological variations. All that we can say, at present, is that (1) very considerable group differences in levels of cultural-intellectual status must be recognized, in the case of groups derived from different European stocks; (2) such group differences, to a significant degree, are found among children brought up in English-speaking homes in American cities and attending the same public schools; but (3) no controlled studies have been made that throw any clear light on the extent, if at all, to which such differences may have a hereditary basis. In any case, we have seen that there are no large persistent differences in fertility between European stocks in this country that cannot be resolved into regional or social group differentials.

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[19] These 26 states were selected for the purpose of Bagley's analysis as having a high proportion of native persons.

[20] For an illuminating statement of the effects of the peculiar "Colonial economy" of the South on the development of this region, see Vance, 1932, *Human Geography of the South.*

Rather than go further with the differences between European stocks, we will give our attention to some studies of differences in intelligence test performance between primary races in the United States, where somewhat more critical and extensive investigations have been carried out. We will not deal with comparisons between whites and Chinese and Japanese, because there is not enough difference in apparent levels of intelligence here to make the problem interesting. We will also neglect discussion of the hereditary capacities of Mexicans, because less adequate data are available. After a brief treatment of data on American Indians, we will turn to studies of American Negroes.

The most extensive studies of the relation of degree of Indian ancestry to intelligence test performance have been reported by Garth (1931). His results and conclusions are summarized as follows:

> "The first effort to apply the method of correlation in racial studies was made by Hunter and Sommermeir when they tested a group of mixed-blood Indians of known degree of Indian blood with the Otis Intelligence Test at Haskell Institute. When they correlated intelligence-test score with degree of white blood, holding constant days of attendance at school and age, they obtained a correlation of 0.41.
>
> "In a similar investigation with mixed-blood Indians Garth and two of his graduate students found a positive correlation of 0.42 between degree of white blood and an approximate I.Q. [based on group verbal tests] when grade placement as a factor had been held constant. There was a correlation of -0.45 between degree and school grade when I.Q. was held constant. The approxi-

> mate I.Q. was obtained from the results of National Intelligence Test scores which had been administered to 609 mixed-blood Indians, 89 full-blooded Indians, and 67 whites. The Indians were tested in Indian schools on Indian reservations in South Dakota, Oklahoma, New Mexico, and Colorado. The whites came from a representative white population" (1931, p. 34).

The following correlations between National Intelligence Test I.Q. and degree of white blood among Indians in different school grades is reported by Garth (1931, p. 35):

Grade IV (134 cases)	$r=+.70\pm.04$
Grade V (169 cases)	$r=+.76\pm.024$
Grade VI (180 cases)	$r=+.22\pm.06$
Grade VII (112 cases)	$r=+.23\pm.06$
Grade VIII (75 cases)	$r=+.24\pm.06$

Garth, 1933, reports much lower positive correlations between degree of Indian blood and intelligence for an equally large series, apparently drawn from a similar environmental setting ($r=.19\pm.02$ with age held constant; $r=.16\pm.02$ with both age and school grade held constant).

Garth, himself, who states that his initial bias was in the opposite direction, now attributes the association observed between degree of Indian blood and intelligence wholly to environmental factors:

> "It is our opinion that the improvement in I.Q. for mixed-blood Indians is due to the social status of the Indian, which improves in a somewhat regular way with the increased white influence. Just the fact that he has more white blood favors the individual in his social contacts. He is more familiar with white customs and ideals, he comes and goes more freely according as he has more white blood. Social workers among Indians have noted the changed social status which runs with increased degree of white blood. The social status operates more powerfully for the less educated mixed-blood than for the more educated" (1931, p. 41).

Dark Southern Negroes show a distinctly inferior distribution of intelligence test scores in comparison with light Southern Negroes, according to Ferguson, and Koch and Simmons. Ferguson's findings at Camp Lee are summarized as follows:

> "In order to check the results obtained from the writer's division of colored troops into lighter and darker classes on the basis of skin color, it was arranged that the enlisted men who assisted at the examinations should similarly classify eight additional companies. In these companies there were 1,071 men, of whom 727, or 68 per cent., were illiterate. Of the illiterates, 11 per cent. were rated as lighter in skin color, while of the literates 18 per cent. were rated as lighter. In Alpha, the darker negroes scored 60 per cent. as high as the lighter; in Beta they scored 80 per cent. as high" (pp. 725–726).

It is a matter of common observation, well supported by statistical evidence, that there is a much higher proportion of mulattoes among Negro leaders than in the Negro population at large. Reuter, 1918, and 1931, has presented the most extensive treatment of this topic. In interpreting this situation, Reuter gives considerable weight both to the possibility that European ancestry in general supplies a higher frequency of genetic factors favorable to intellectual superiority than does African ancestry, and to the influence of superior cultural advantages enjoyed by light-skinned Negroes. Nevertheless, he believes that neither of these obvious explanations, nor the two together, give a sufficient explanation of the phenomenon. He, therefore, gives greatest weight to the tendency of the mulatto to attract all superior colored individuals, due to the social superiority enjoyed by light-skinned Negroes. As an illustration of this tendency, Reuter presents an analysis by degree of color for 143 married men who are life members of the National Negro Business League, and for their wives (*see* Table 73).

TABLE 73

CLASSIFICATION BY COLOR OF 143 LIFE MEMBERS OF THE NATIONAL NEGRO BUSINESS LEAGUE, AND OF THEIR WIVES *

Number and Color of Men	Number and Color of Their Wives				
	Black	*Dark Mulattoes*	*Mulattoes*	*Light Mulattoes*	*Near-White*
Black, 14	2	2	3	5	2
Dark mulattoes, 20	0	5	5	8	2
Mulattoes, 40	1	2	18	9	10
Light mulattoes, 42	0	3	2	24	13
Near-white, 27	0	2	4	8	13
Totals, 143	3	14	32	54	40

* From Reuter, 1931, *Race Mixture; Studies in Intermarriage and Miscegenation,* p. 159.

Such indications suggest the emergence of a mixed group, intermediate between whites and Negroes in racial type, characterized by superior ability, and enjoying a social status superior to that of most Negroes in the United States.

On the other hand, Peterson and Lanier report low correlations of doubtful significance between intelligence ratings and racial traits for colored boys in New York City public schools. Length of residence in New York City appears to be more significantly correlated with intelligence than any of these racial indices. The correlations of Yerkes Point Scale intelligence test scores with Negroid traits, reported by Peterson and Lanier for the New York City sample are as follows (p. 90):

Intellectual development with	
Nose width (Negroid)	$r=-.11\pm.077$
Lip thickness (Negroid)	$r=+.07\pm.078$
Ear height (Negroid)	$r=-.15\pm.076$
Interpupilary span (Negroid)	$r=+.01\pm.078$
Composite of these four traits	$r=-.13\pm.076$
Length of residence in New York City	$r=+.20\pm.065$

These writers report a slightly higher correlation (cir. .20±.07) between whiteness of skin and intelligence scores in their Nashville and Chicago samples—but skin color is subject to some environmental effects, so that this fairly low correlation might be due to the darker complexion of children coming from rural areas.[21]

Herskovits, using a superior Negro group, 115 Howard University students, calculated coefficients of correlation between scores on the Thorndike College Entrance Intelligence Examination and indices of racial origin. The results of these correlations are, as he says, "indefinite and vague in the extreme." The coefficients of scores with other traits run as follows (p. 40):

Intellectual development with	
Nose width (Negroid)	$r=+.014$
Lip thickness (Negroid)	$r=-.198$
Black pigmentation (Negroid)	$r=-.144$
White pigmentation (white)	$r=+.172$

The Howard students include a wide variation, as regards degree of white admixture, according to students' reports, ranging from "unmixed Negroes" (22 per cent) to persons having "more white than Negro" ancestry (14.8 per cent).

We may conclude (1) a larger proportion of light persons are found among the Negro intelligentsia than in the illiterate masses, but (2) among Negroes who enjoy superior social status degrees of white admixture have little significance for intelligence. It is hardly necessary to add that, as regards their African and also their Indian ancestry, American Negroes are derived from different tribes, living under different conditions; and, as regards their white ancestry, some Negroes are descended from some of the "poorest," others from some of the "best" families in the South.

A suggestion in the direction of showing relationship between some physiological functions (such as metabolism and speed of nerve conduction) and some intellectual abilities is afforded in a study by Roland C. Davis, 1933, *Ability in Social and Racial Classes.* Other suggestions along this line have been offered, but such studies are at present highly experimental. It is well known that extreme deviations in glandular functions may affect mentality, as evidenced by the association of mental deficiency with cretinism and the effect of some stimulants on intellectual processes. It is not inconceivable that smaller normal variations in physiological processes—apart from differences in the number, structure or arrangement of brain cells—might have similar effects in lesser degree. The subject offers an interesting field for research, but no useful results have yet been established.

The same must be said of the study of possible biological variations among races in specific factors in intelligence, following the lines of analysis developed by Spearman, Kelley, and others.[22] On the other hand, the work of

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[21] Pigmentation in these studies is determined by the use of rotating color discs.

[22] Kelley has used Darsie's findings in a study of Japanese-white differences on various ele-

Klineberg and others in differentiating speed scores from accuracy scores in performance tests with Indians and rural Negroes does afford interesting results which are usually interpreted on the theory that speed tests are especially subject to environmental influences. Klineberg found that the low scores made by these rural race groups on performance tests were due in large part to the speed element. Similar results have been found by other investigators working with isolated white groups.

The study of changes in intellectual abilities in relation to age, physiological maturity, and environmental factors affecting different groups also offers interesting possibilities for refined research techniques. These have hardly developed yet to the point where they throw much light on the nature of differences commonly observed in school children, except for the general principle that older children in rural areas usually compare less favorably with urban children of the same age than do their younger brothers and sisters. This result is commonly interpreted as showing the influence of environment on acceleration or retardation in intellectual growth. Garth finds a somewhat different result in extensive tests with Southern Negro children. He reports that the I.Q. of these children appears to rise rapidly during the early years of elementary schooling but to remain constant after the fifth grade is reached or even to show apparent decline (p. 94). Garth attributes the apparent decline to selective factors in the samples which he has used. He considers the absence of any further rise through continued schooling beyond the fifth grade as evidence that "the environment had done about all it could for these Negroes. It had settled down to a relatively dead level as an excitant after the fifth grade. One has but to see the Southern Negro in his environment to realize that this may be true in part" (pp. 94–95).

Studies of infants offer another interesting approach to the study of race differences. Mary Cover Jones reported the absence of any significant race or sex differences in three groups of children, American, Italian, and Negro, studied in New York City—except that in the test of facial expression (smiling to visual stimulus) slight differences were found in favor of the

ments of the Army Beta, Stanford Achievement, and Stanford-Binet tests to suggest significant differences in the mental structure of different races (pp. 223–227). This study indicated marked white superiority in vocabulary and reading tests, but marked Japanese superiority in such tests as Digit-Symbol Test, Digits Reversed, and Code, involving memory for number material and spatial manipulation. But in spite of the effort to control the foreign-language factor by selecting subjects familiar with English, it is impossible to know to what extent these results might be affected by differences in early training, the bilingualism of the Japanese, and other uncontrolled variables. Dunlap, using Stanford Achievement data for school children in Honolulu, has combined good control of social background, age and sex with advanced statistical techniques in the study of ethnic differences in specific types of ability. Seven race groups are studied: Chinese, Japanese, Portuguese, Hawaiians, Part-Hawaiians, and Filipinos. These data, however, show sex differences in specific abilities which are larger than the apparent race differences. In arithmetic reasoning the males exceed the females in absolute scores, in all groups. But in the verbal tests no significant sex difference is usually found. In view of these sex differences it is extremely difficult to give any consistent interpretation to the apparent race differences in specific factors. The whole subject of possible ethnic differences in specific intellectual capacities remains a problem for future investigation.

boys and also in favor of the Negro group. These results were obtained with 365 subjects in three localities, about equal numbers being examined in each group. The social stratum is described by the author as being ordinary in each case, but not including many of the very poorest families. McGraw tested sixty Negro and sixty-eight white children ranging in age from two to eleven months at Tallahassee, Florida, using the Hetzer-Wolf Baby Test. She estimates that about 50 per cent of the babies born during the year in each group in this community were subjects in her investigation. She reports that in central tendency the white babies were found to be superior in terms of developmental age, development quotient, and percentage of successful reactions at specific age levels. She also reports much overlapping in the ratings of the two groups, "there being a greater difference between the individuals within a group than there is between the means of the two groups" (pp. 93–94). The white babies showed more advanced development in height and weight as well as in behavior patterns. It is impossible, however, at present to attach much significance to group differences in developmental norms for infants, because we do not know to what extent, if at all, these norms have prognostic value for later intellectual development. A recent study by Nancy Bailey (to be published) indicates that the norms of infant development now in use may have little or no predictive value for intelligence.

We have already noted that there are very large regional differences among Negroes living in different localities. These differences are usually correlated with regional differences in other social and cultural factors.[23] Charles H. Thompson has shown that Peterson's data on variations in intelligence test performance among Negro and white school children in several different localities are closely paralleled by the corresponding indices of school efficiency. School efficiency may vary, to some extent, in relation to the responsiveness of pupils. But school appropriations and educational policies, determined by white officials in different localities, which are the primary variables in indices of school efficiency, cannot be very greatly influenced by the quality of the Negro pupils. Differences between white and colored groups in different localities are shown by a series of examinations by Peterson, using tests standardized by Pressey on Indiana school children. The average of the median scores of the children in Grades IV–VIII, divided by the corresponding median ages, have been computed for each group. The resultant average scores have been expressed in relation to the average scores for Indiana school children, as a base number, taken as 1.000. The results are shown in Table 74.

Thompson, who prepared this comparative table on the basis of Peterson's data, has also computed a table showing the comparative efficiency of

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[23] Regional variations in social-economic condition are not always paralleled in the two race groups of the South. For example, Harper, 1923, 1924, has shown that almost all indices of socio-economic status show that Negroes living in the richest counties of Alabama are poorer than Negroes living in association with less aristocratic and less wealthy whites.

TABLE 74

An Age-Grade Comparison of the Achievements of the Nashville (White and Negro), Hamilton County (White and Negro), and Shelby County (White and Negro) Groups, in Terms of Their Efficiency Relative to Indiana Children *

Groups [a]	Grades					
	Fourth	*Fifth*	*Sixth*	*Seventh*	*Eighth*	*Average*
1. Indiana	1.000	1.000	1.000	1.000	1.000	1.000
2. Nashville (white)	0.899	0.908	0.937	0.969	0.945	0.931
3. Shelby (white)	0.793	0.909	0.844	0.822	0.854	0.844
4. Hamilton (white)	0.720	0.797	0.753	0.845	0.836	0.790
5. Nashville (Negro)	0.539	0.681	0.779	0.823	....	0.705
6. Hamilton (Negro)	0.719	0.636	0.612	0.670	0.756	0.690
7. Shelby (Negro)	0.612	0.508	0.680	0.656	0.600	0.611

* From Thompson, 1928, "The Educational Achievements of Negro Children," *The American Negro* (*Annals of the American Academy of Political and Social Science*, Vol. 140), p. 198. Data from Peterson, 1923, *The Comparative Abilities of White and Negro Children.*

[a] The numbers tested in each group were as follows: Nashville, white, 326; Nashville, Negro, 223; Hamilton County, white, 207; Hamilton County, Negro, 196; Shelby County, white, 121; Shelby County, Negro, 263.

school systems for colored and white children for the same sections of Tennessee and the State of Indiana, as a whole, on the basis of school rating indices prepared and developed by Ayres, Phillips, and Thompson. The results of this comparison are as follows:

TABLE 75

A Comparison of the School Efficiencies of the School Systems of Indiana, Nashville (White), Hamilton County (White), Shelby County (White), Hamilton County (Negro), Nashville (Negro), and Shelby County (Negro) *

School Systems	Index of Efficiency	Each School System as per Cent of the Indiana School System	Corresponding Intelligence Ratings (Repeated from Previous Table)
1. Indiana	43.58	100.00	1.000
2. Nashville (white)	40.35	92.35	0.931
3. Hamilton County (white)	37.55	86.11	0.790
4. Shelby County (white)	37.22	85.40	0.844
5. Hamilton County (Negro)	32.82	75.30	0.690
6. Nashville (Negro)	30.58	70.16	0.705
7. Shelby County (Negro)	27.16	62.32	0.611

* From same source as Table 74.

It will be immediately observed that there is a very close parallel between the relative efficiencies of the several school systems and the comparative intelligence test ratings. The chief divergence appears to be that Hamilton County whites and Hamilton County Negroes both make lower intelligence test scores than might be expected on the basis of the corresponding indices for school efficiency.

The question of the possible influence of selective migration on the distribution of intelligence among Negroes living in different areas has been studied most intensively by a group working in association with Otto Klineberg of Columbia University. It is impossible to say anything about the character of the early movement of freed men, but their descendants constitute a small element in the present Negro population of Northern states. The studies by Klineberg and others afford some objective data on the character of recent migrants. These data were collected during 1930 and 1931. These materials have previously been available only in unpublished Masters' Essays at Columbia University, but will be given a systematic presentation and interpretation in a forthcoming publication by Klineberg. Data are available from one of these studies on five groups of Negro girls, aged 10 years, selected at random from one public school, and classified according to length of residence in New York.

Group A. Born in the South; residence in New York, less than one year.
Group B. Born in the South; residence in New York, one year, but less than two.
Group C. Born in the South; residence in New York, two years, but less than four.
Group D. Born in the South; residence in New York, four years or more.
Group E. Born and educated in New York.

TABLE 76

Stanford-Binet Intelligence Quotients of Negro Girls According to Length of Residence in New York City *

	Number	Mean I.Q.	Sigma	Difference of Means between Group and Next Group	Sigma of Difference	Difference Divided by Sigma of Difference
Group A	20	81.8	9.14	4.0	2.7	1.5
Group B	20	85.8	7.91	4.5	2.6	2.1
Group C	19	90.3	6.45	4.2	3.4	1.2
Group D	20	94.1	12.6	4.4	3.3	1.3
Group E	28	98.5	9.47			

* From Skladman (unpublished Master's Essay). For full account *see* Klineberg, 1934.

A small but consistent evidence of the influence of length of residence in the New York area appears at every step in this series. Similar results were obtained by the use of a group test (Otis Self-Administering Test, Intermediate Form) with a larger sample of twelve-year-old Negro girls (*see* Table 77).

The results of a third investigation along similar lines using results of National Intelligence Tests on 517 twelve-year-old Negro public school children, selected at random, also shows higher scores for Negro children with longer length of residence in New York City (*see* Lapidus, 1931; *see also* Klineberg, 1934).

A new valuable technique for studying the possible influence of selective factors in migration has been developed by Klineberg and associates in

TABLE 77

Otis Examination Scores of Negro Children in New York City Grouped According to Birthplace, Compared with Group Born in New York City *

	Born in New York City	Born Elsewhere in North	Born in South	Born in West Indies	Born in North	Born in South and Islands	All Subjects
Number	243	75	170	30	318	200	536
Median score	28.269	26.870	22.878	22.850	27.941	22.870	25.750
Average score	30.853	28.900	25.130	25.335	30.390	25.150	28.310
Coefficient of variation	48.97	54.775	56.820	57.11	50.032	51.133	51.721
Sigma	15.110	15.830	13.000	14.470	15.205	12.860	14.570
Difference of average	—	1.953	5.733	5.518	0.463	5.703	2.828
Sigma of difference	—	2.068	1.390	2.431	1.290	1.328	1.155
Difference divided by sigma of difference	—	0.944	4.12	2.270	0.358	4.294	2.447

* From Traver (unpublished Master's Essay). For full account, *see* Klineberg, 1934.

studying Negro migrations from Southern areas. Records are obtained of examination marks or teachers' estimates of all pupils in classes which include children who have migrated. The relative position of the migrants is then determined on a point scale ranging from 0 to 100, with the normal median at 50. In the scale used by Klineberg the normal expectation for the lower quartile is 36.5, and for the upper quartile 63.5. In other words, if the migrants do not differ from the non-migrants we should expect the ratings for 25 per cent of them to be distributed below 36.5 points, 50 per cent below 50 points, and 75 per cent below 63.5 points. Thus it is possible to estimate not only the central tendency of any migratory movement, as regards the comparative intellectual development of the migrants and of those left behind, but also to note whether or not a disproportionate number of dull individuals (in the lower quartile) or superior individuals (in the upper quartile) move out or are left behind. Some of the most important results of this investigation are summarized in Table 78.

The data for single years are not shown here. In Birmingham there is some evidence of secular trend. The northward migrants from this city in the earlier period, 1914–1918, seem to be a distinctly inferior group. The weighted average of the medians of the year-groups in this period (186 cases) is 41.8, or 8.2 points below normal expectation. During the later period, 1920–1924, the weighted average of the medians of the year-groups of migrants from Birmingham (73 cases) is 50.2, approximately normal expectation. No secular trend is apparent in the Nashville data. Year-groups are not reported for Charleston.[24]

[24] For more complete presentation of these materials, *see* Klineberg, 1934.

TABLE 78

Distribution of School Grades of Negro Migrants as Compared with Total Population in the Same Classes in Negro Schools in Southern Cities *

Location	Destination	Number of Cases	Distribution of Ratings		
			*Q*₁	*Median*	*Q*₃
Total population, scaled			36.5	50	63.5
Nashville 1921–1930	Northern states	184	39.3	52.9	67.3
	Kentucky, or West Virginia	23	30.1	42.0	53.1
	Southern states	110	35.0	44.5	60.4
	Returned	89	33.9	44.5	67.6
Birmingham 1914–1924	Northern states	303	30.3	44.8	56.7
	Kentucky, or West Virginia	20	39.5	54.5	64.5
	Southern states	57	33.5	52.8	66.1
Charleston	Northern states	75	41.2	55.6	70.2

* From Hand (unpublished Master's Essay).

The principal results of this study may then be summarized as follows:

1. Migrants from Birmingham to Northern states during the War period appear to be distinctly inferior to non-migrants.

2. Migrants from Birmingham to Northern states during the later years for which records are available, as well as migrants from Birmingham to other Southern localities seem to represent an average "run of the mill."

3. Migrants from Nashville to Northern states appear to be slightly superior to non-migrants. The difference is small, but appears at the median and at the first and third quartiles.

4. Migrants from Nashville to other points in the South appear to be somewhat inferior to those who remain in Nashville.

5. Negroes who migrate from Charleston to Northern states appear to be distinctly superior to the total population sampled in this area. The numbers in this case are small, but the differences are considerable. The ratings of more than 40 per cent of the migrants in this case are above the upper quartile of the general population; less than 20 per cent are below the lower quartile.[25]

Some explanation of the difference in results obtained at Birmingham during the War period from results obtained at Nashville and Charleston may be found in the fact that Birmingham has been a "boom city" with increasing demand for Negro workers. The population of Nashville has also been increasing steadily but that of Charleston has recently declined. The increases in population in these three cities during the last three decades run as follows:

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[25] Out of 57 cases 25 are above 64.5 on the point scale, only 10 are below 34.5.

	Population Increase, U. S. Census Data *1900–1910* *Per Cent*	 *1910–1920* *Per Cent*	 *1920–1930* *Per Cent*
Nashville, Tenn.	36.5	7.2	30.0
Birmingham, Ala.	245.4	34.8	45.2
Charleston, S. C.	5.4	15.5	−8.4

The Negro population of Birmingham more than tripled in the decade, 1900–1910. Since opportunities for employment in Birmingham continued to be good throughout the War and early post-war period, migrants from Birmingham may have been of a different type from migrants from static or decadent areas.

The reader will remember that the data on migration from Tidewater counties of Virginia, presented by Gee and Corson, showed rather less evidence of selective character in the case of the Negro migration than in the case of the white migration from these rural districts to cities and to Northern states.

The data at this critical point are obviously very fragmentary. No data seem to be available that throw any clear light on the character of earlier movements of slaves and free Negroes to and from different parts of the United States. It seems extremely unlikely, however, that any selective factors in these movements would go very far toward explaining the large differences found between the average intelligence quotients of Negroes living in different localities.

It is difficult to say, in this connection, what significance should be attached to the very high rates of apparent mental deficiency among Negroes in some sections, notably in the Chesapeake Bay area and in the Mississippi Valley, as indicated by rejections for mental deficiency by army psychiatrists, and, as regards the Chesapeake area by Baker's investigation in Baltimore (*see* Chapter VII). The high incidence reported among Negroes from the Chesapeake Bay area is especially striking, because Negroes in this vicinity have had fairly decent educational opportunities for some time, although separate schools are maintained for whites and Negroes, and the economic outlook for Negroes is discouraging.

Apparently we have at present no real evidence concerning differences in central tendency or in general distribution curves for hereditary mental capacities between whites and Negroes. In any case, even on the basis of present attainments, there is obviously great *overlapping* in ability. All major ethnic groups which at present show inferior average cultural-intellectual development include many brilliant individuals. An extensive survey of the comparative abilities of white and Negro college students by Graham indicates that about one-fourth of the Negro college students are superior in intelligence test performance to the median of white students, although the average for Negro students is lower than the average for white students. Again, although the average intellectual development of Negroes in this country is much lower than that of whites, we have seen that about one-half of the Negro recruits from Northern states surpassed the median of whites from several Southern states in present intelligence test ability.

It is apparent that further studies are still needed for an accurate determination of the part played by possible biological differences between Negroes and whites in factors affecting intellectual development.[26]

It is possible also that biological differences in temperament and personality are in this case causal factors of more importance to cultural level than are differences in capacity for intelligence. But even less scientific work has been done on this problem.

If it is so difficult, in the light of the best studies which have yet been made, to determine the extent to which genetic differences may contribute to the difference in cultural level between whites and Negroes, it is certainly very hazardous to form conclusions, on the basis of present evidence, about the hereditary capacities of more closely related ethnic stocks with smaller differences in present levels of cultural-intellectual development.

In any case, as we have noted, there are, at present, no large differences in reproduction trends between ethnic groups that cannot be interpreted in terms of variations among regional groups and among social groups. There is certainly a much more adequate scientific foundation for efforts to effect a redirection of present reproduction tendencies within large ethnic groups than for population policies concerned with racial groups now living in this country, considered as units.

4. *Social Groups*

In dealing with the possibility that biological factors may be in part responsible for variations in the intellectual development found among children derived from different social groups, one encounters conflicting prejudices that have a basis in economic conflict between social classes. On the one side, such differences may be accepted as justifying in some degree present inequalities in the distribution of wealth. On the other hand, among those who are concerned to effect a different social order, there is a counter tendency to repudiate any suggestion of biological differences among social groups. This conflict of prejudices is really irrelevant to the kind of differences to be discussed in this section. We may recognize in advance that if wealth were to be distributed on the basis either of present levels of intellectual development or on the basis of biological capacities the situation would resemble that which Gilbert and Sullivan had in mind in Strephon's proposal that the British peerage be reformed on the basis of "competitive examination." The radical character of Strephon's proposal would hardly be affected by the possibility that unusual ability may be proportionately more frequent among British peers than in the population of Great Britain at large.[27]

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[26] One study, which, although expensive, would cost much less than has been spent on various inconclusive studies in this field, could be counted on to yield conclusive results regarding the hereditary capacities of the broad Negro masses for intellectual development. A social agency, or several coöperating social agencies, might obtain jurisdiction over an adequate number of orphan children under one year of age derived from representative black parents in Southern rural communities. These babies could then be carried North and placed as adopted children in the homes of well-educated, intelligent urban Negroes, who might be interested in the experiment, but who primarily would be motivated by the considerations that normally lead families to adopt children. The children could then be tested, first in their homes and later in their schools, without ever being made conscious of the experiment. After such an experiment, if competently managed, we would really *know* something about the capacities of some ten million American citizens. The results of such a study might be of far reaching importance in determining educational and other social policies affecting Negroes.

The approach to this problem through the study of variations in development and performance among infants and nursery school children, derived from different social classes, at different age levels may some day provide important results, but at present the evidence from such studies is ambiguous. We have already stated, in describing racial groups, that we simply do not know to what extent the present developmental norms and tests for infants, prior to the period of language development, have prognostic value for later intellectual development. It is, therefore, not surprising to find that Linfert and Hierholzer find no difference between infants derived from different social classes, whereas Gesell, Symmes, and others report fairly large differences. And after language development begins to be fairly well established, there is little logical justification for an assumption that variations among nursery school children are any less affected by environmental influences than variations among grade school children.

At any rate, present evidence about children aged two to five years derived from different social groups is conflicting in import. Goodenough, 1927, using Kuhlmann-Binet tests with nursery school children of native white parentage, in Minnesota, found coefficients of correlation in the vicinity of .3 between the intelligence of the child and the social status of the parents, as measured by educational level or by occupation. Furthermore, this association appeared quite as clearly among the younger as among the other children in the preschool group. There is no significant difference in this series between the degrees of correlation (intelligence and social status) found at ages two, three, or four years.

Witty reports a still higher coefficient of correlation ($r = .48 \pm .02$) between Stanford-Binet ratings of 458 preschool children (aged 3 to 6 years) and Barr scale ratings of the occupational status of their fathers, at Lawrence, Kansas.

Kawin, 1934, however, presents materials which tell quite a different story. She compares preschool children from the Hull House district in Chicago in the Mary Crane Nursery School (Hull House) with children from the upper commercial and professional group in a nursery school at Winnetka. Using the Stanford-Binet, a considerable difference is apparent, the mean I.Q. of the Hull House group being 105.4, whereas that of the Winnetka group was 123.4 (p. 138). But inasmuch as many of the children came from homes using a foreign language, such a result, on the basis of a language test, has little significance. Using the Merrill-Palmer Scale, however, with 62 children from each group, matched for age, the difference between the two groups in percentile rank is reduced to 5.2 points, with a probable error of 3.4 points. In view of the wide difference in social background between the two groups such a small difference, of doubtful statistical significance, is surprising. We may presume that the Merrill-Palmer Scale is a valid test of intelligence for preschool children, and that the samples used are truly representative of the populations from which they are drawn; most psychologists endorse the former assumption, and Kawin's statement of research procedure is convincing. But we cannot be wholly certain about these presumptions; and one must always watch for chance effects in dealing with small samples.[28] On these assumptions, the evidence presented by Kawin tends to show that the mixed, largely foreign-born, low-income population of a metropolitan city like Chicago may be not very different genetically, as regards average intellectual capacity, from more established classes with very superior social status. The author cited strongly inclines to such an interpretation. She adds, however, that "the present writer believes it probable that the exclusion [by other investigators] of all cases with foreign-language handicaps lowers the level of intelligence for the lower socio-economic group" (p. 159). This carries the inference that any genetic inferiority that may be associated with inferior economic status exists chiefly among families which have lived for several generations in a fairly similar environment. This difference between children from the families of low economic status studied by Goodenough and Witty and the families of similar status studied by Kawin may be quite as important as the use of non-language tests by the latter, in interpreting the difference between their results.

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[27] Referring to the Haggerty-Nash data, which have been used extensively in this book, we find that 25 per cent of 524 New York village children whose fathers are classified as semi-skilled (brakeman, policeman, barber, mail-carrier, truck-driver, chauffeur, factory-hand) have intelligence quotients as high as or higher than the median I.Q. of 944 children whose fathers are described as business or clerical (executive, foreman, manager, office worker, salesman, contractor, clerk, station agent, retail merchant, real estate, insurance, manufacturer). The overlapping is less, of course, if groups at the two extremes are compared, e.g., children of professional workers with children of unskilled laborers; yet we find that 20 or 25 per cent of the children of professional workers usually receive lower ratings than the highest 25 per cent of the children of unskilled workers.

In dealing with social groups it is possible, in a few cases, to proceed beyond inferences based on indirect evidence (to which we were wholly limited in treating racial groups and regional groups) and to take account of the ratings of children who have been brought up from early infancy in social groups different from the social groups of their original parents.[29] Unfortunately, we are limited here to three studies, one by Freeman, Holzinger, and Mitchell, in Chicago, one by Burks in California, and one by Lawrence in

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[28] There is about one chance in three that there is no difference in Merrill-Palmer Scale ability between the two populations sampled by these groups. But there is an equal chance that the true difference may be twice as great as that reported.

[29] See method listed as Number 5, in the first section of this chapter.

England. The first two of these studies were published in 1928 in the *27th Yearbook of the National Society for the Study of Education.* The last was published in 1931 in the Monograph Supplement of the *British Journal of Psychology.* A fourth study of similar type is now in progress in Minnesota, but no results are yet available.

The studies by Freeman *et al.* and by Burks were primarily directed to the study of the respective rôles of nature and nurture in causing individual differences. Both studies indicated the operation of both sets of influence, but there was considerable divergence as regards the relative importance of each. These results have been reviewed extensively elsewhere.[30] No explicit comparison is made in either study between groups of foster children classified according to the social status of their original parents; but significant comparisons of this sort can be made between the legitimate and the illegitimate groups among children placed before two years of age in the Chicago series, and between foster children and own children all located before one year of age in the California series. In both cases we are able to compare groups of children whose original parents differed significantly in social status but who were brought up from infancy in the same or similar environments.

In the Chicago series, a large proportion of the original parents from whom the legitimate foster children were derived were economically dependent, whereas the parents of the illegitimate foster group seem to have been a fairly random sample of the general population (*see* Table 79).

TABLE 79

OCCUPATIONAL STATUS OF FATHERS OF LEGITIMATE AND OF ILLEGITIMATE CHILDREN IN FOSTER HOMES IN THE VICINITY OF CHICAGO, COMPARED WITH FOSTER FATHERS AND WITH THE GENERAL POPULATION *

Occupation	Original Fathers		Foster Fathers	All Males in Illinois
	Legitimate	*Illegitimate*		
	Per Cent	*Per Cent*	*Per Cent*	*Per Cent*
Professional	1	10	15	3
Semi-professional and business	2	16	41	35
Skilled labor	26	41	38	39
Semi-skilled to slightly skilled labor	34	28	5	15
Common labor	37	5	1	8
Total	100	100	100	100

* From Freeman, Holzinger, and Mitchell, 1928, "The Influence of Environment on the Intelligence, Social Achievement, and Conduct of Foster Children," pp. 140, 144.

Furthermore, 51 per cent of the legitimate mothers but only 25 per cent of the illegitimate mothers for whom record of mental condition was made by social workers were described as "mentally defective"—a rating which apparently was made quite liberally (p. 146). Only 30 per cent of the legitimate mothers, but about 60 per cent of the illegitimate mothers from whom educational records were obtained had completed the grammar school. These two groups of children would, therefore, appear to differ significantly as regards the social status of their original parents. There seems to have been some selective placement of the children in their foster homes, even in the case of children placed before two years of age. However, a consistent difference appears between the mean intelligence ratings for the legitimate children (largely drawn from dependent families) and for the illegitimate children, placed in foster homes before two years of age, even within each type of foster home, as graded by field investigators (*see* Table 80).

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[30] See Schwesinger, 1933, pp. 247–277.

TABLE 80

MEAN INTELLIGENCE QUOTIENTS OF LEGITIMATE AND ILLEGITIMATE CHILDREN PLACED IN FOSTER HOMES BEFORE TWO YEARS OF AGE *

Type of Foster Home, as Rated	Legitimate		Illegitimate		Total	
	Number of Children	*Mean I.Q.*	*Number of Children*	*Mean I.Q.*	*Number of Children*	*Mean I.Q.*
Good (23–30)	10	106.5	45	112.4	55	111.3
Average (16–22)	19	98.3	39	104.9	58	102.8
Poor (8–15)	16	83.4	27	95.6	43	91.3
Total	45	94.8	111	105.7	156	102.6
Standard deviation of I.Q.'s	15.8		15.1		16.0	
Mean rating for foster homes	19.6		17.6		20.4	
Standard deviation of home ratings	5.7		5.6		5.5	

* From Freeman, Holzinger, and Mitchell, 1928, "The Influence of Environment on the Intelligence, Social Achievement, and Conduct of Foster Children," p. 175.

The consistent variation in average intelligence ratings in relation to type of home, both in the case of the legitimate and in the case of the illegitimate groups, may be influenced by selective placement but undoubtedly is due in large part to environmental factors. On the other hand, the difference within each type of home between the legitimate and the illegitimate groups apparently points to hereditary factors which are related to the divergence of their parents in social status. The latter series of differences ranges from 5.4 to 12.2 I.Q. points, with an average difference of 8.1 for the three comparisons. This average is nearly three times the standard error of the difference between the means for the two series (S.D. 2.8 I.Q. points); and therefore is presumably reliable. Again, the average intelligence of 36 own children raised in the same or similar homes (mean I.Q., 112.4 ± 1.6) is 9.6 I.Q. points above the average intelligence of the illegitimate foster children (p. 136). The deviation of the mean intelligence of the legitimate foster children below the mean of the illegitimate foster children, and the contrary deviation of the mean intelligence of the own children in the homes represented by the foster parents above this mean seem to indicate hereditary deviations in genetic capacity below and above the mean for the general population in the social groups represented by these samples.

In the California study by Burks 214 foster children, placed before one year of age, are compared with 105 own children brought up in homes matched for social status with the foster homes of the foster children. Again the original parents of the foster children, many of whom were of illegitimate birth, seem to have been a fairly random sample of the general population, whereas the foster parents and those in the control group include an unusually high proportion of persons in the upper occupational levels (*see* Table 81.)

TABLE 81

Occupational Status of Original and Foster Fathers and of Fathers in Control Group in Burks' Series *

Occupation	Original Fathers [a] 94	Foster Fathers 204	Control Group 103
Professional	8.5	18.2	20.4
Business owners or managers	8.5	39.2	32.0
Commercial employees	19.1	10.3	13.6
Salesmen	9.6	8.3	11.7
Ranchers or farmers	6.4	4.9	3.9
Skilled laborers	33.0	15.2	10.7
Semi-skilled	6.4	1.0	4.9
Unskilled	8.5	2.0	1.9
Retired	—	1.0	1.0

* Adapted from Burks, 1928, "The Relative Influence of Nature and Nurture upon Mental Development," pp. 254, 267.

[a] Exclusive of 25 fathers listed as students (9) or as in the army or navy (16).

We may then compare the intelligence ratings of the foster children in this series (derived from parents presumably representing a fairly random sample of the general population, and placed in their foster homes before one year of age) with the intelligence ratings of the children in the control group who were born as well as brought up in homes of distinctly superior average social status. We find that the mean intelligence quotient of the latter group (115.4 points) is 8 points above the mean intelligence quotient of the foster group (107.4 points) (p. 201). This difference, because of the larger samples, is statistically more conclusive than the corresponding differences, which are very similar in degree, indicated in the Chicago series. In the California study, about 8 per cent of the foster children but only 2 per cent of the own children have intelligence quotients below 90.[31] Conversely, only 2 per cent of the foster children but 6 per cent of the own children have intelligence quotients above 140. The results obtained from these two studies thus agree very closely, as regards the problem with which we are concerned. In both cases a significant difference is found between groups of children with diverse *hereditary* social backgrounds but brought up in equivalent *social environments*, in favor of the groups whose original parents had superior status, as judged by occupations of the fathers.

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[31] The reader should note that even with environment constant some regression toward normal is expected among children whose parents are subnormal (*see* next section, this chapter).

TABLE 82

DISTRIBUTIONS OF INTELLIGENCE QUOTIENTS OF 214 FOSTER CHILDREN PLACED UNDER ONE YEAR OF AGE AND 105 OWN CHILDREN, IN SAMPLES OF HOMES MATCHED FOR SOCIAL STATUS AND CULTURAL LEVEL *

Intelligence Quotient	214 Foster Children	105 Own Children
	Per Cent	*Per Cent*
140 and over	1.9	5.7
130–139	4.7	9.5
120–129	11.2	21.9
110–119	24.3	24.8
100–109	29.9	26.6
90–99	20.1	9.5
80–89	4.2	——
70–79	2.3	1.9
Under 70	1.4	——
Mean I.Q.	107.4	115.4

* Data from Burks, 1928, "The Relative Influence of Nature and Nurture upon Mental Development," p. 261.

Lawrence, 1931, described an investigation of variations in intelligence among children placed in one institution before one year of age, classified according to the social status of their original parents. The situation of the children in this study is described as follows (pp. 3, 4):

> "Dr. Smith's Home [a fictitious name] is a large and important charitable institution, subsisting mainly on the funds of a 200-year-old foundation. Its purpose is to provide a healthy and moral home for illegitimate children who would otherwise be brought up under degrading conditions; and secondly, by relieving the mother of the trouble and humiliation involved in the possession of an illegitimate child, to enable her to start afresh and recover what she may have lost of social status.
>
> "For these reasons only the first illegitimate child of any mother is received. . . . Where the father can by some coercion be compelled to provide for the child, the mother is assisted in applying that coercion, in preference to being relieved of the baby. As a result, all the cases are ones of desertion by the father. Careful enquiries into all the circumstances of the case are made, and it is insisted on that the mother should give the father's name and occupation as well as her own. No child more than a year old is taken. The numbers admitted at from 1 to 6 months are about equal to those from 6 months to a year. . . . The children are given fictitious names, and are entirely ignorant of their parents' identity and circumstances.
>
> "The babies, on leaving their mothers, are boarded out in approved cottage homes in the country, at convenient distances from the town from which the organization is controlled. The cottagers who receive the children are usually

> agricultural laborers of the better type. All homes are inspected at intervals. The children become very attached to their foster-mothers, whom they usually regard as their real mothers. When they give up the children, many of the foster-mothers keep in touch with them for years, visiting them at intervals, writing to them and sending them presents.
>
> "At between 5 and 6 years old all children are brought to headquarters, which is the original old building of the foundation. This is their home until they are 15 or 16. . . .
>
> "The Home has its own schools within the grounds. . . . The buildings are old-fashioned and the classes large."

The five social ratings used in this study are described as follows:

> "Class A, a small one, was the professional class, and in it would have been included children from the highest social levels if any had been found. [Farmers and elementary school teachers were included in this class.] Class B was that of tradesmen, clerks, and a few of the most highly skilled artisan groups, such as compositors, lithographers, and engine drivers. Class C was the big middle group of skilled and semi-skilled workers, of which bricklayers, train and bus drivers, and policemen are examples. Class D contained the unskilled workers, such as porters, navvies, farm laborers, and unskilled factory hands. Class E was a residual group, including dock laborers, street peddlers, gypsies and paupers" (p. 13).

Little significance can be attached to the very small groups at the top and bottom of this series, especially in the case of "Class A," which includes "farmers" as well as elementary school teachers: "Its members certainly do not come from Class A of the population as a whole." It appears therefore that the classification of this series by social class of mid-parents (i.e., average social ratings of both parents) really permits of only three significant divisions, as follows:

(1) *Class A-B.* Tradesmen, clerks, highly skilled artisans, and a few professional workers and independent farmers.
(2) *Class C.* Skilled and semi-skilled workers.
(3) *Class D-E.* Unskilled or irregular workers.

Intelligence quotients based on the Simplex Test (an English group test) are available for this series, as well as those based on (individual) Stanford-Binet examinations. The correlation between the two series in the case of the boys is .79±.02, and in the case of the girls .72±.03 (p. 11). The differences between the groups classified by social ratings of mid-parents are slightly greater on the basis of the Stanford-Binet Test (which Lawrence, in line with general psychological opinion, regards as "the best we have") than on the basis of the Simplex Test. But the two series agree very well. The mean intelligence quotients, based on combined ratings on Binet and Simplex, for boys and girls in each of the groups described above are represented in Figure 46. The difference between the groups would appear slightly greater if based wholly on Stanford-Binet.[32]

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[32] It is likely that chance factors affecting the Simplex scores may have caused the apparent difference, thus indicated, to be somewhat less than the true difference between these groups.

The difference in mean intelligence quotients between boys and girls in this series is somewhat surprising. On the Stanford-Binet, the average difference between all boys and all girls is 2.67 points and the standard error of this difference is 1.55; on the basis of the Simplex, the difference is 1.81 and the standard error of this difference is 1.12. These differences are not "statistically reliable," although the probability that they may be significant is expressed by the fractions .96 and .95, respectively. In other words, an equal difference might be expected by chance four or five times in every one hundred trials, assuming normal distribution in a single, homogeneous universe from which the samples were being drawn. By itself, such a result might be described as "suggesting" the possibility of a "real" difference between the samples. If we turn for "corroboration" to other studies, however, we find that this suggestion of a real difference in intelligence between boys and girls of school age is not confirmed—some studies showing a difference in this direction, but about as many others showing a difference in the opposite direction. We may conclude then that this "suggestion" of a real difference in intelligence between boys and girls of school age may be dismissed as having no true significance.

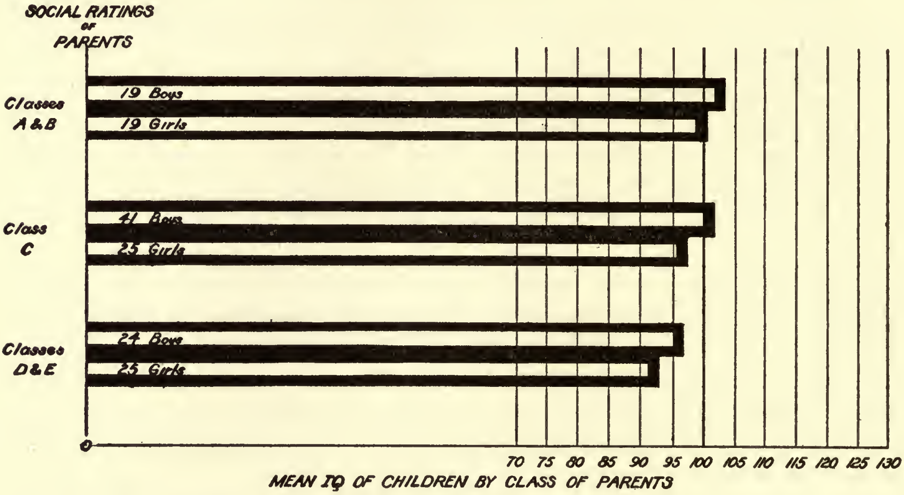

FIG. 46. MEAN INTELLIGENCE QUOTIENTS OF CHILDREN IN ONE ORPHANAGE ("DR. SMITH'S HOME"), BY SOCIAL CLASS OF PARENTS. Data from Lawrence, Evelyn M., 1931, *An Investigation into the Relation between Intelligence and Inheritance.*

We are, of course, much more concerned about the significance of the apparent differences between groups classified by social ratings of their original parents (ratings for both parents being expressed as average ratings for mid-parents). The following tables have been prepared by the present writers on the basis of data presented by Lawrence, in order to investigate this problem as critically as possible.

TABLE 83

Mean Stanford-Binet Intelligence Quotients of Children Classified by Social Status of Parents

Mid-Parent Classes	Boys			Girls			All Children		
	Number of Cases	*Mean I.Q.*	*Standard Deviation*	*Number of Cases*	*Mean I.Q.*	*Standard Deviation*	*Number of Cases*	*Mean I.Q.*	*Standard Deviation*
A-B	30	105.5	12.0	23	100.9	11.1	53	103.5	10.8
C	69	102.1	13.8	38	98.7	11.5	107	100.9	13.1
D-E	36	98.5	10.0	31	93.5	12.0	67	96.2	11.3

TABLE 84

Differences between Mean Standard-Binet Intelligence Quotients of Children Classified by Social Status of Parents

Mid-Parent Classes	Boys			Girls			All Children		
	Difference between Mean I.Q.'s	*Difference Divided by Its Standard Error*	*Probability that This Difference Is Significant*	*Difference between Mean I.Q.'s*	*Difference Divided by Its Standard Error*	*Probability that This Difference Is Significant*	*Difference between Mean I.Q.'s*	*Difference Divided by Its Standard Error*	*Probability that This Difference Is Significant*
A-B and C	3.4	1.17	.88	2.2	.73	.77	2.6	1.38	.92
C and D-E	3.6	1.39	.92	5.2	1.83	.97	4.7	2.66	.996
A-B and D-E	7.0	2.59	.995	7.4	2.31	.990	7.3	3.60	.999+

TABLE 85

Mean Simplex Intelligence Quotients of Children Classified by Social Status of Parents

Mid-Parent Classes	Boys			Girls			All Children		
	Number of Cases	*Mean I.Q.*	*Standard Deviation*	*Number of Cases*	*Mean I.Q.*	*Standard Deviation*	*Number of Cases*	*Mean I.Q.*	*Standard Deviation*
A-B	20	101.7	13.4	19	101.4	10.4	39	101.5	12.0
C	41	100.7	14.2	25	95.9	13.5	66	98.9	14.2
D-E	25	96.6	10.9	25	93.3	11.1	50	94.9	10.5

TABLE 86

Differences between Mean Simplex Intelligence Quotients of Children Classified by Social Status of Parents

Mid-Parent Classes	Boys			Girls			All Children		
	Difference between Mean I.Q.'s	*Difference Divided by Its Standard Error*	*Probability that This Difference Is Significant*	*Difference between Mean I.Q.'s*	*Difference Divided by Its Standard Error*	*Probability that This Difference Is Significant*	*Difference between Mean I.Q.'s*	*Difference Divided by Its Standard Error*	*Probability that This Difference Is Significant*
A-B and C	1.0	.26	.60	5.5	1.48	.93	2.6	.87	.81
C and D-E	4.1	1.24	.89	2.6	.74	.77	4.0	1.68	.95
A-B and D-E	5.1	1.42	.92	8.1	2.47	.993	6.6	2.76	.997

TABLE 87

MEAN (COMBINED) INTELLIGENCE QUOTIENTS OF CHILDREN CLASSIFIED BY SOCIAL STATUS OF PARENTS

Mid-Parent Classes	Boys			Girls			All Children		
	Number of Cases	*Mean I.Q.*	*Standard Deviation*	*Number of Cases*	*Mean I.Q.*	*Standard Deviation*	*Number of Cases*	*Mean I.Q.*	*Standard Deviation*
A-B	19	103.1	12.9	19	100.3	8.8	38	101.7	11.2
C	41	101.1	13.1	25	97.1	12.3	66	99.6	13.0
D-E	24	96.5	10.9	25	92.8	10.7	49	94.6	11.0

TABLE 88

DIFFERENCE BETWEEN MEAN (COMBINED) INTELLIGENCE QUOTIENTS OF CHILDREN CLASSIFIED BY SOCIAL STATUS OF PARENTS

Mid-Parent Classes	Boys			Girls			All Children		
	Difference between Mean I.Q.'s	*Difference Divided by Its Standard Error*	*Probability that This Difference Is Significant*	*Difference between Mean I.Q.'s*	*Difference Divided by Its Standard Error*	*Probability that This Difference Is Significant*	*Difference between Mean I.Q.'s*	*Difference Divided by Its Standard Error*	*Probability that This Difference Is Significant*
A-B and C	2.0	.55	.71	3.2	.96	.83	2.1	.84	.80
C and D-E	4.6	1.45	.93	4.4	1.35	.91	5.0	2.18	.985
A-B and D-E	6.6	2.40	.992	7.6	2.51	.994	7.1	2.97	.998

This analysis indicates the presence of a real difference in intelligence between the children in this sample derived from parents with average ratings as Class D-E and children derived from parents with average ratings as Class A-B. Considering the results for all children (boys and girls, combined) on the Stanford-Binet, there appears to be less than one chance in a thousand of obtaining a difference equal or greater than that obtained here between these groups—on the basis of the assumptions that are usually made by statisticians in the treatment of data of this sort. The somewhat lower reliability of the corresponding difference obtained with the Simplex data is to be expected in view of the consideration that scores on this test are probably more subject to chance variations than scores obtained with the Stanford-Binet Test.

It must be noted, however, that the statistical treatment of the data does not afford any insight into the nature of this real difference. Here we must return to a consideration of the conditions of the study. So far as the present writers can see there is only one possible alternative interpretation of this result that has any plausibility, at all, other than the interpretation in terms of heredity. This is the suggestion that the children were selectively placed in different boarding homes in relation to the social ratings of their parents; but inasmuch as these children were merely being placed temporarily in paid boarding homes, and inasmuch as the (temporary) foster mothers were presumably not informed about the original parents of the children,[33] this suggestion has very little plausibility. We conclude that it is "morally certain" that there is some difference in hereditary capacity between the parental group represented by Class D-E and the parental group represented by Class A-B.

Since the preceding paragraph was written, we have received a communication from Lawrence on this subject, which we quote, omitting only the introductory remarks and a confidential identification of the institution:

> "I myself felt that Dr. Smith's home was a good field for this enquiry, as it is rare to find an institution of any size taking in its children so young. . . . Its rather quaint old rules of admission just happened to make it peculiarly suitable for my purpose.
>
> "The family history of the children has no influence on the choice of the homes to which they are sent. I have written to the Secretary to verify the point. He replies, 'As regards the placing of our children in cottages in the country, apart from our doctors in the country endeavoring to find clean and suitable homes there is no selection whatever—in fact I allot the children to the various homes entirely in rotation.'"

The mean difference in intelligence between the extreme groups described above (A-B and D-E) amounts to about 7 I.Q. points in each of the comparisons on the basis of the Stanford-Binet tests, varies from 5 points to 8 points on the Simplex Test, and is just 7 I.Q. points on the combined scores for both boys and girls. This difference is very similar in degree to the differences found between groups with diverse origins but equivalent social environments in the two American studies reviewed above. In all three studies the difference in mean intelligence scores between the groups compared is in the same direction as the differences usually observed between groups of children born and brought up in different social groups. And in all three cases the difference in intelligence between children with quite different hereditary social backgrounds, when social environment is held constant, amounts to about one-third or one-half of the difference that would be expected between groups born and brought up in equally diverse social groups. In the English data the difference between the A-B group and the C group is small, and if considered by itself, would be of doubtful significance. But one must remember that there was a very inadequate representation in this sample of the professional and upper commercial groups in which very superior intellectual development appears most frequently.

We conclude that (1) there is a strong probability (amounting in judgment of the present writers to a "moral certainty") that the lowest social groups are inferior to and the highest social groups superior to the large middle occupational classes in a typical American urban group, as regards *average* hereditary capacities for intellectual development, but (2) there is clearly much *overlapping*, as regards the intelligence of individuals, among all classes, and undoubtedly even greater overlapping in hereditary capacities than in apparent cultural-intellectual levels.

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[33] It is explicitly stated by Lawrence that none of the children had been told anything about their original parents. This being the institutional policy, it seems extremely unlikely that any of the boarding mothers would be informed about the origin of the children.

5. *The Efficacy of Genetic Selection for Intelligence on the Basis of Apparent Characteristics*

Considerable controversy has taken place during the last thirty years regarding the exact implications of genetical principles for theories about the selection of biological types, in view of the fact that the hereditary potentialities (*genotypic characteristics*) of any individual may be quite different from his apparent traits (*phenotypic characteristics*).

The acute controversy which arose because of discrepancies between the mathematical treatment of Mendelian principles by the English biometric school and the interpretations developed by experimental geneticists has now been largely resolved by the work of Fisher, Haldane, Wilson, Wright, and others.[34] Some current discussions of the relation of genetics to eugenics

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[34] Karl Pearson, in 1904, in the twelfth of his *Mathematical Contributions to the Theory of Evolution* developed some of the implications of the Mendelian principles of particulate inheritance. He investigated, among other problems, the degree of correlation which might be expected between a parent and a child (the parental correlation) or between sibs (the fraternal correlation) on the hypothesis of an indefinite number of pairs of alternative genes, the dominant and recessive phases being present in equal numbers, assuming that mating be random and that the combined effects of the different factors be represented by simple addition. He found that the parental correlation would be .33 and the fraternal correlation, .42. The corresponding parental coefficient derived from Pearson's data on stature is .51 and the fraternal correlation from the same data is .54. A few years later, 1906, Yule suggested that the most satisfactory explanation of the discrepancy between parental and fraternal correlations might be the denial of the genetical theory of pure dominance with reference to multifactor human traits and a return in such instances to the older hypothesis of blended characteristics. Pearson later accepted this point of view. This solution was never accepted by the experimentalists, and seemed to be constantly weakened by the accumulation of new experimental evidence.

In 1918, R. A. Fisher published the results of an exhaustive mathematical analysis of the problems involved. In this study he showed that the empirical results were perfectly consistent with rigid Mendelian principles, and that theoretical correlation values as high as the empirical findings would result from a more complex system of hypotheses, taking into account (1) variations in the *frequencies* of dominant and recessive phases, (2) degrees of assortative mating (known as *homogamy*, i.e., likeness of spouses), (3) *epistacy* (variations in the combined effect of different factors), (4) variations in *degrees of dominance*, (5) the possibility of *multiple allelomorphs*, and (6) *environment influences*. The present authors do not assume competency to pass judgment on the validity of all the highly technical aspects of Fisher's contribution. The argument with which we are principally concerned, however, seems to be conclusive and has never been critically challenged, so far as we are aware, by any competent authority. It is confirmed in its most important aspects by an independent investigation by E. B. Wilson, carried out with simpler conditions and with more direct statistical methods. These studies show that the high parental and somewhat higher fraternal correlations observed in man, as well as in other animals, are wholly consistent with strict Mendelian principles if the artificial hypotheses of equal frequencies of dominant and recessive phases and of random mating are abandoned. Both Fisher and Wilson develop formulae describing the relationship between parental correlation, fraternal correlation, relative frequency of recessive phase, and degree of assortative mating, with reference to any trait; but the empirical application of such formulae is, as Wilson emphasizes, subject to much ambiguity. The central point is that varying correlations between parents and offspring and between sibs may be expected in traits determined by Mendelian inheritance when varying proportions of recessive phases and varying degrees of assortative mating are taken into account. The applicability, on Mendelian principles, of the doctrine that "like makes like" is thus clearly may be dismissed as mere repercussions of this old controversy. But, at other points, genetic theory carries very important implications for eugenic procedure. We will devote our attention wholly to these significant considerations.

We have already noted (Chapter V) that the results of genetic research indicate the serious difficulties besetting any attempt to eradicate rare pathological traits. Abnormal variations are in large part recessive, appearing only in individuals who receive a double inheritance of the gene phase which tends to cause these traits, because rare pathological traits if dominant are likely to be weeded out rapidly through natural selection. In the case of a recessive trait determined by a single gene substitution in a population mating at random (with no special tendency toward marriages among kin or among persons who resemble each other) the proportional frequency of individuals who carry this one gene for this trait as a hidden, recessive factor must be roughly (not exactly) equal to the *square* of the fraction of the population who receive a double inheritance of such genes and therefore actually show the trait. Therefore the preponderant majority of the genes for such a recessive trait will then be carried by apparent normal individuals. Therefore the more rare any recessive trait may be, the less effective any given degree of selectivity will be, if applied only to apparently defective individuals, in reducing the frequency of the hereditary factors tending to cause such a trait. The converse of this proposition holds good for a very common recessive trait appearing in a majority of the population and determined by a single gene substitution. In the case of a very common trait, selection will be more rapid if this trait is determined by recessive gene phases than if it is determined by dominant gene phases.

The effects of slow selection for a trait determined by single autosomal (not sex-linked) gene phase in a population mating at random are shown in Figure 47. In this chart the effects of a gradual selective process operating through thousands of generations are exhibited. The curves represent an evolutionary change from the appearance of a trait in 1 per cent of a population to its appearance in 99 per cent of the population for a dominant trait (upper curve) and for a recessive trait (lower curve). In both cases it is assumed that the less favored type has a reproductive rate per generation which is just 99.9 per cent of the reproductive rate per generation of the more favored type. At this rate, the change in the frequency of the favored characteristics from 1 per cent of the total to 99 per cent of the total population takes 16,582 generations. In human societies selective processes operate at a very different pace, but the relative efficacy of selec-

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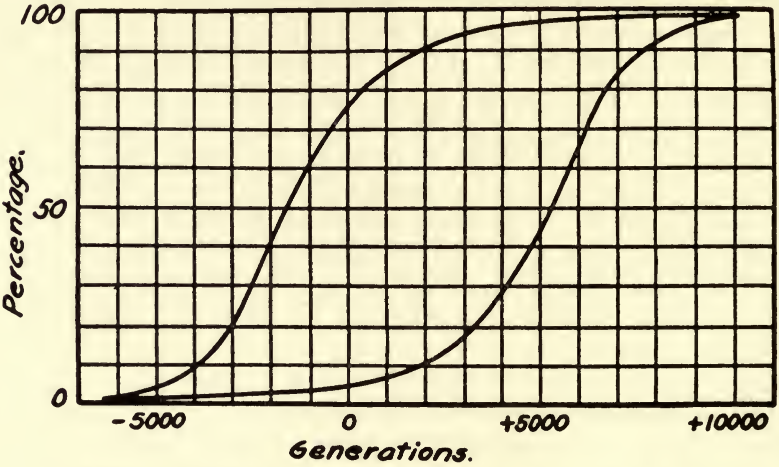
established, in so far as its application is warranted by empirical data, such as the data from which familiar correlations are derived. *See also* Haldane, J. B. S., "Heredity" in *Encyclopaedia Britannica,* 14th Edition, " R. A. Fisher showed that the results of Pearson and his colleagues followed from the assumption that such characters as stature were due to multiple genes acted on by natural selection, and thus healed the breach between the Mendelian and biometric schools." *See also* Hogben, *Genetic Principles in Medicine and Social Science,* p. 171.

tive processes for dominant and for recessive traits at different type-frequencies is the same. The relations shown in this diagram are summed up in the following statement (Haldane, 1924, p. 25):

> "Dominants increase more rapidly than recessives when they are few, more slowly when they are numerous. The change occurs most rapidly when the proportion of [single autosomal] recessives [in a total population mating at random] is 56.25%."



EFFECT OF SELECTION ON POPULATION COMPRISING TWO PHENOTYPES WITH MENDELIAN INHERITANCE

Upper curve, dominants favored; lower curve, recessives favored. Abscissae = generations; ordinates = percentage of population with the favored character. After J. B. S. Haldane.

FIG. 47. EFFECT OF SELECTION ON POPULATION COMPRISING TWO PHENOTYPES WITH MENDELIAN INHERITANCE. Upper curve, dominants favored; lower curve, recessives favored. Horizontal scale gives time in generations; vertical scale gives percentage of population having the favored character. After J. B. S. Haldane. Reproduced from Lotka, 1925, *Elements of Physical Biology*, p. 126.

In terms of absolute frequencies of individuals exhibiting any trait, assuming that the size of the total population remains constant, selection is most rapid for a trait determined by genes whereof the alternative phases occur with about equal frequency. If a trait determined by a single gene phase appears very commonly, selection will be rapid and effective if this trait is recessive. Conversely, if a trait determined by a single gene phase appears very rarely, selection will be rapid and effective if this trait is dominant, but slow and difficult if it is recessive.

It has sometimes been supposed that "feeblemindedness" can be regarded as a unitary trait determined by a single recessive gene phase. If this were so, and if the genes causing this defect were scattered promiscuously through a whole population mating at random (with no tendency toward kin marriages or assortative mating), the elimination of mental deficiency by preventing the reproduction of defectives would be a very slow process. On this hypothesis, even if all defectives were prevented from reproducing, it would require 22 generations to reduce such a defect from an incidence of one case per 100 to an incidence of one case per 1,000 total population; it would take 68 generations to reduce it from one case per 1,000 to one case per 10,000 total population—according to estimates by Fisher, 1924.

If "feeblemindedness" is caused by several different types of genes (and, in the absence of evidence to the contrary, there is every reason to suppose that this is so), the situation on the assumptions stated above would be even worse. For if the supposition is correct, there must be several genetically different types of feeblemindedness. Each of these several types would necessarily be rarer than all types combined—according to an axiom which we all learned in Elementary Geometry—so that the ratio of all recessive factors to all apparently defective individuals would be raised, thus lowering the possible efficacy of genetic selection on the basis of apparent traits.

We can, however, gain a much truer insight into the problems of selection for intelligence by recognizing that we are concerned here with variations caused by many genetic factors, the variations appearing in normal distribution. Mental deficiency can then be represented as one tail of the normal distribution curve for intelligence. Presumably, many of the genetic factors favoring intelligence are dominant and many of them are recessive; and their alternative gene phases presumably occur with varying frequencies. The real index of the efficacy of selection in such a case would be afforded by a correlation table showing the actual relationship of these variations among kin. After a long-continued and intensive selection, such a correlation table would be changed, as the gene phases in some cases became more nearly balanced and in other cases less so. But no significant change of this sort would be expected until the average intelligence of the general population concerned had been greatly changed.

In the case of intelligence it is impossible to supply correlation tables that are unaffected by environmental influences. We do find, however, that the combined effect of heredity and environment seems to produce a relationship between parents and children in intelligence which is very similar to that which would be expected purely on the basis of Mendelian factors. Thus we ordinarily find significant correlation in intelligence between parents and children; and we also find a tendency toward regression toward the mean for the general population in the case of children derived from parents who deviate sharply to one extreme or the other. Both of these tendencies are well marked in a series described by Outhit. Outhit's sample includes only families with four or more living children, all of whom were old enough to be given intelligence tests. The sample was intentionally selected to be as heterogeneous as possible (*see* Table 89; *see also* Figure 48).

TABLE 89

Distribution of Intelligence Quotients of Parents and Children in 51 Families with Four or More Children, by Occupation of Fathers *

Occupation of Families	Number of Families in Each Class	Mean I.Q. of Parents (Based on Army Alpha Ratings) [a]	Mean I.Q. of Children (Based on Stanford-Binet for Children Aged 3–11 Years, Army Alpha Ratings for Children Aged 12 Years and Over) [a]
Professional	8	127.76	125.13
Business and clerical	12	120.16	116.72
Skilled labor	14	104.97	104.28
Semi-skilled	11	90.55	94.84
Unskilled	6	87.05	96.42

* From Outhit, 1933, *A Study of the Resemblance of Parents and Children in General Intelligence*, p. 32.

Of the 51 families included in the study, 21 were from cities, 23 from small towns, and 7 from rural districts. There were 21 families from New York State, 18 families from New Jersey, Illinois, Massachusetts, California, and District of Columbia (combined), and 12 families from Nova Scotia. The selection was limited to English-speaking, literate parents with no serious physical or sensory defects, having four living children or more, the youngest being 3 years old or over.

[a] Age 14.10 years was used as growth limit, or adult level.

A regression toward the mean values is indicated here both in the case of children derived from parents with very high average intelligence ratings and in the case of children derived from parents with very low average intelligence ratings. Nevertheless it is equally apparent that children with very low or with very high intelligence do not appear at random; but the former come mostly from families with low mid-parent intelligence ratings, and the latter come mostly from families with high mid-parent intelligence ratings. These results are undoubtedly affected by environment, but they simulate very nicely the results that might be expected on the basis of genetic principles.

Various kinship correlations are shown for this heterogeneous group, and compared with those found by Jones and associates for a more homogeneous New England village population (*see* Table 90).

Extreme idiocy is apparently more sporadic in its appearance than the milder degrees of mental deficiency. This has been shown most conclusively by Wildenskov of the Keller Institution for Mental Defectives in Denmark, presenting fresh materials that agree in general tenor (and sometimes quite precisely) with results obtained by other investigators including Brugger, Lokay, and Reiter and Osthoff (*see* Wildenskov, pp. 37ff.) and with the results obtained in England by the Mental Deficiency Committee (*see* Chapter VIII, above). Wildenskov found that the children with mild mental deficiency, the "school material," were derived from families with much poorer economic status on the whole than the children with extreme defect, the "asylum material." He also found that among 207 living sibs of in-

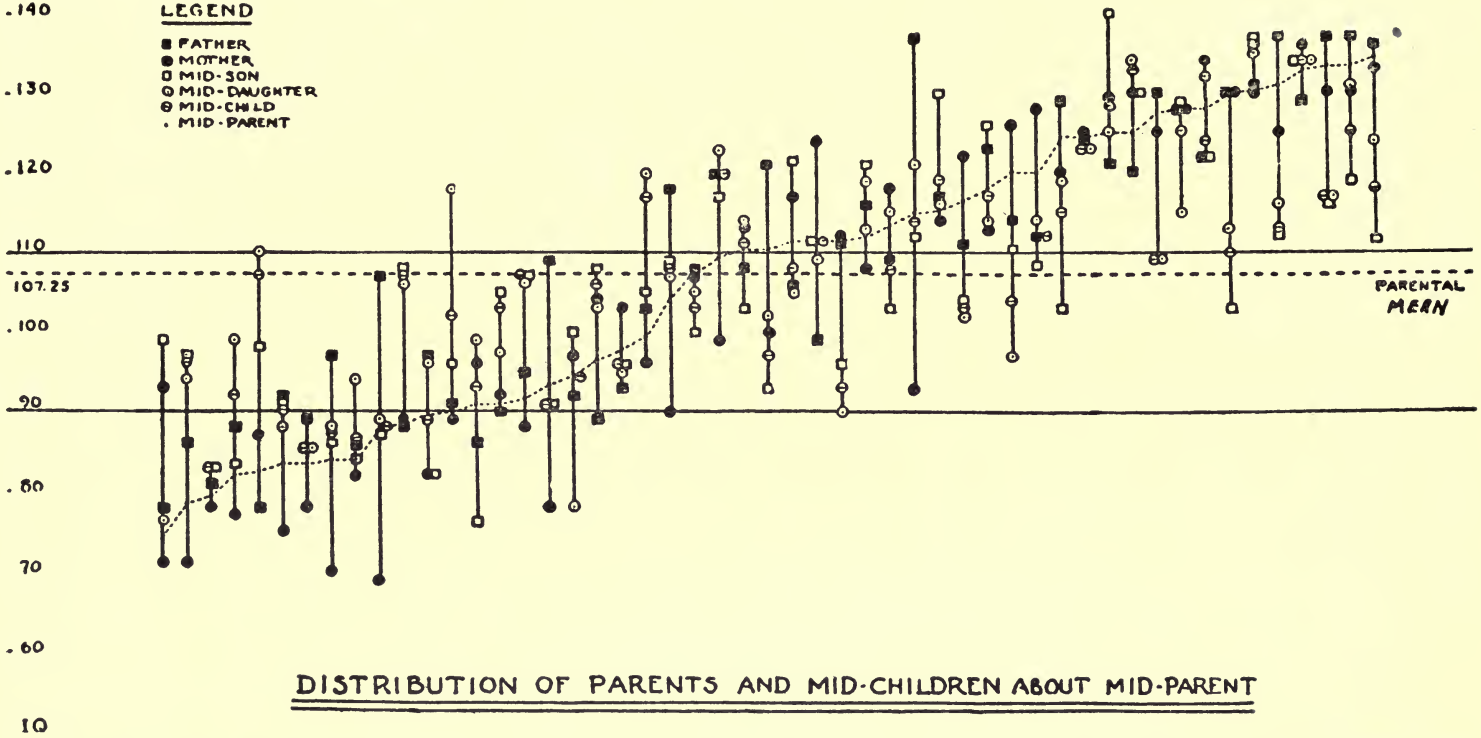


FIG. 48. DISTRIBUTION OF INTELLIGENCE QUOTIENTS IN 51 SELECTED LARGE FAMILIES LIVING IN DIFFERENT ENVIRONMENTS ABOUT MID-PARENT INTELLIGENCE QUOTIENTS. From Outhit, 1933, *A Study of the Resemblance of Parents and Children in General Intelligence*, p. 41.

TABLE 90

Parent-Child Correlations in Intelligence among Families Living in a Homogeneous Environment and in a Sample Drawn from Varied Sources *

I.Q.'s Correlated	Families in New England Villages (Jones *et al.*)	Families from Varied Sources (Outhit)
Mid-parent, mid-child	.693±.034	.802±.033
Superior parent, mid-child	.662±.037	.744±.042
Inferior parent, mid-child	.660±.037	.780±.037
Father, mid-son	.580±.048	.628±.050
Father, mid-daughter	.492±.054	.692±.050
Mother, mid-son	.608±.048	.700±.049
Mother, mid-daughter	.591±.044	.697±.049
Father, mid-child	.592±.043	.694±.049
Mother, mid-child	.653±.038	.775±.038

* From Outhit, 1933, *A Study of the Resemblance of Parents and Children in General Intelligence*, p. 49.

dividuals in the "school material," 22 per cent were classified as feebleminded and another 29 per cent as intellectually retarded, whereas among 196 living sibs of individuals in the "asylum material" only 8 per cent appeared as feebleminded, with another 18 per cent classified as intellectually retarded.[35] An even wider divergence between the families of these two groups is indicated by Wildenskov in the case of the parents. Thus 25 per cent of the parents of the "school material" were classified as feebleminded, but only 1 per cent of the parents of the "asylum material," reviewed in this study. Such familial association in apparent mental deficiency may be due in part to environmental factors, but the tendency for such deficiency to "run in families" is apparent. The more sporadic character of extreme idiocy may be due in part to accidental factors and in part to the operation of several rare recessive genes in causing idiocy.

In searching for experimental studies of hereditary traits which supply a proper analogy for genetic expectations in the case of human intelligence, we should turn, not to studies of traits determined by a single gene substitution, but to studies of traits or abilities, such as stature, racing capacity in horses,[36] or maze-learning in rats.[37] Such traits appear in some degree in all members of a given species, and their variations ordinarily conform fairly well to a normal distribution curve.

Fisher, 1930, has summarized the results of an exhaustive mathematical treatment of inheritance in stature in the following observation, on the hypothesis that environmental factors affecting the distribution of stature remain constant:

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[35] These classifications are based in part on the results of mental tests but for the most part on the use of school records, gossip, and personal interviews; but all of the families in this series were investigated personally by Dr. Wildenskov. We have substituted familiar English terms for the classes of deficiency defined by Wildenskov, using the term "feebleminded" for individuals supposed to have an intelligence quotient below 75, and using the term "retarded" for all other "oliogophrenics."

[36] *See* Laughlin, 1933, 1934.

[37] *See* Tryon, 1929, 1931, 1932; also Schwesinger, 1933, *Heredity and Environment*, pp. 334–335.

> "It appears from the observed average statures of the offspring of parents of different heights that no extreme selection would be needed to increase or decrease the stature of a human population by one inch in each generation, and even with the long generations of Man, such a rate of change would transcend the largest observed racial differences, within a short historical period" (p. 105).

An experimental demonstration of the possibility of rapid selection, through controlled breeding of differentiated strains with reference to a complex functional trait with qualitative differences among individuals, is shown in Figure 49. The original parent group, from which the "Bright" and "Dull" strains (as regards maze-running ability) were selected, consisted of 142 rats, intentionally selected as making up a very heterogeneous group. The reader will note that after eight selective matings such distinct strains have been established that the overlapping in ability between the two groups has become quite negligible. He should also note, however, that the rapidity of this selective process was due, in part, to the fact that the performance of parents as well as individuals to be mated was taken into account in the selection of the F2 generation, and in all later selections the performance of the individuals themselves, their parents, and any previous progeny of the individuals to be selected were all taken into account. Nevertheless, in the first generation, after selection based wholly on the performance of the individuals to be selected, the median learning score of the offspring of Bright parents was some ten per cent better (indicative of fewer errors) than the median learning score of the Dull and Median parents combined [38] (a difference equal to slightly more than twice its probable error, and therefore, by itself, of probable but doubtful significance).

We do not assume that genetically there are any factors in common between intellectual capacity in human beings, maze-learning ability in rats, racing capacity in horses, or stature in man. We are simply concerned to show that the effects of selective processes with reference to such complex functional traits supply a much better analogy to the effects to be expected in selection for such a trait as human intelligence than experiments with selection for simple traits, determined by a very few genetic factors. Any social attempt to influence the reproduction rates of members of different groups would presumably have some relevance to the characteristics of the near-kin of the individuals concerned, but any application of the "progeny test" would seem wholly inapplicable—except that the appearance of an obviously defective child from any mating might be recognized as constituting an even more valid basis for preventing further reproduction than

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[38] In later matings the median group was left out of the picture, but this apparently was not the case in the first series (1929, p. 83).

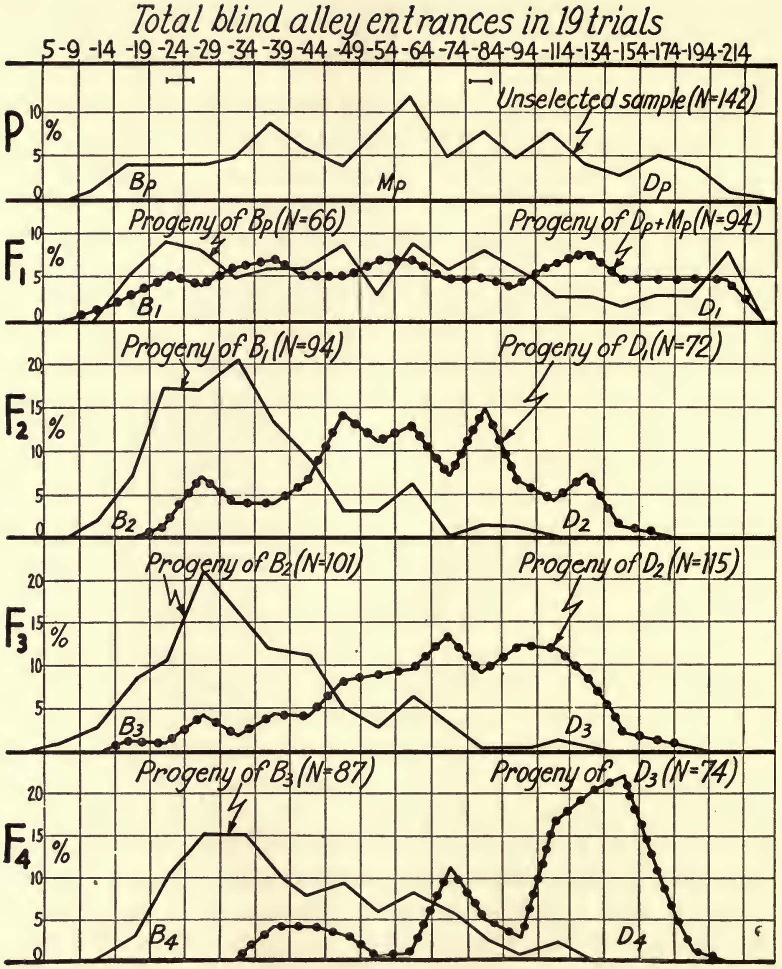
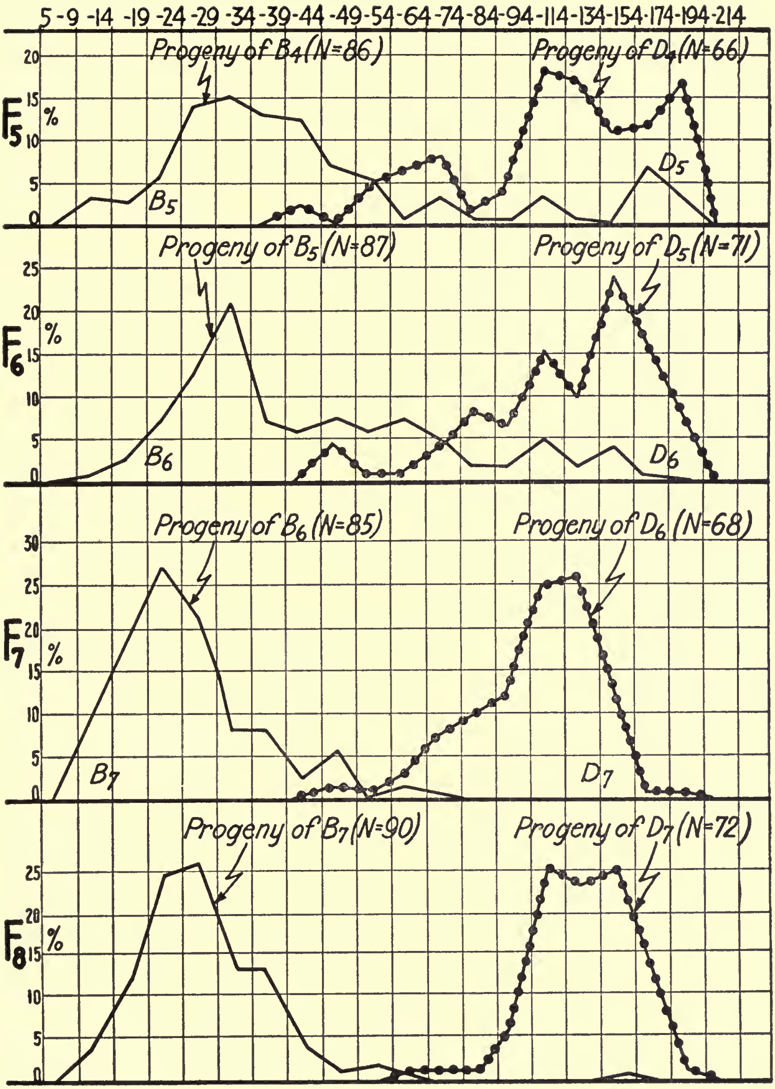


Fig. 49. Effects of Selective Breeding on Maze Learning. From Tryon, "Individual Differences," in *Comparative Psychology*, edited by Moss, pp. 428–429. The scale of brightness as evidenced by the total number of blind alley entrances made in 19 trials is shown along the top of the diagram. A bright animal who made only 10 to 14 errors would be classed "–14" on this scale; a dull one who made from 195 to 214 errors would fall in the class "–214." The first generation of rats marked "P" to the left is shown just below the scale. The per cent of them



grouped in each class on this scale is indicated in the distribution curve. The brightest of these were bred together, and then all the others, giving the two F_1 groups, as indicated. Selective breeding has been continued down to the F_8 where the progeny of B_7 (Bright F_7) are markedly different from the progeny of D_7 (Dull F_7). In the later generations the performances of near-kin and progeny were taken into account in the selection (*see* text).

the appearance of marked hereditary defect in one of the partners of any prospective mating.[39]

The effect of *assortive mating* on selection for such a trait as stature, or intelligence, is described by Fisher as follows:

> "In collections of human measurements the resemblance between married persons is a rather conspicuous feature. Its principal biometric effects seem to be to increase the genetic variance produced by a given number of Mendelian factors with given gene ratios, and so to increase in a fixed proportion the intensity of the selection to which each is exposed. The effect of selection in human stature is increased in this way by more than 20 per cent" (1930, p. 99).

In the case of physical traits, such as stature, span, or eye color, Pearson and other investigators have consistently found coefficients of correlation between husbands and wives in the vicinity of .2 or .3 in large samples drawn from English middle classes and similar populations. Considerably higher marital coefficients of correlations are found in intelligence test ratings. Willoughby, Burks, Freeman, and Jones report corrected coefficients ranging from .44 (average of corrected coefficients on 11 tests with one sample) to .62 for seven groups, from California, Illinois, and rural New England, the majority of the samples including one hundred or more pairs, with an unweighted average (corrected correlations, higher than crude) of approximately .55 (Jones, 1929).[40]

[39] Laughlin, 1934, in predicting racing capacity in thoroughbred horses gives equal weight to (1) average performance ratings for the sires and dams of the two parent animals, (2) average performance ratings for the two individuals mated, and (3) average performance ratings for previous offspring from these individuals. He states, however, that this weighting is merely tentative and will be refined by later studies now in process. In any case, of course, one would expect quite different weighting for these three sets of influences in a heterogeneous population, with reference to any traits, than in a thoroughbred population, which has been highly selected for a particular trait.

[40] It is important to recognize that, except in so far as certain types may be left unmated, assortative mating cannot alter the absolute frequencies of allelomorphic genes, or gene phases, in successive generations, but can only influence their distribution. Neglect of this principle led Willoughby, apparently following a lead from Fisher's early work, to assume on the basis of a limited experiment, that homogamy in some situations may neutralize the effects of selective fertility. The principle in question may be very simply illustrated. Suppose that two persons who exhibit a recessive trait determined by a single pair of allelomorphic genes (types *aa*) are mutually attracted because of their similarity. Let us suppose that all marriages in the general population from which these individuals are derived are equally fertile, and that each mating yields four children. The pair then contributes 4 *aa* individuals to the next generation, carrying altogether a total of 8 *a*-phase genes. What were the alternatives? Suppose both had married pure dominants (type *AA*), then each of the eight children thus produced would have carried one *a*-phase gene, again carrying altogether 8 *a*-phase genes. Or, suppose that both *aa* persons had married *Aa* types—then four of the eight children thus produced would have been pure recessives (*aa*), and four would have been heterozygous (*Aa*), thus yielding 12 *a*-phase genes. At first sight this may look like an absolute increase in gene frequencies, but it must be noted that intermarriage between the heterozygotes would have yielded one pure recessive (*aa*), two heterozygous dominants (*Aa*), and one pure dominant (*AA*), i.e., 4 *a*-phase genes. Thus the net contribution of the original pair remains 12–4 = 8 *a*-phase genes. In the case of multi-factor traits the mechanics become more complex, of course, but the essential principle is not affected.

The experiment carried out by Willoughby and Goodrie, 1927, on which Willoughby's theory is based, is a very interesting one. It consisted in handling a card-board population of over a thousand individuals elaborately sorted and shuffled, to represent vital changes over five generations. It is difficult, on the basis of the account offered, to see just how the unrecognized factors, which are logically demanded, were introduced. In fact, the inherent difficulty in the nature of the ex-

The principles which we have been considering are extremely important for the theory of eugenics. They not only indicate very clearly the possibility of effective social eugenics, so far as genetic considerations are concerned, but they have practical import for eugenical procedure. It is apparent that selection for such a trait as intelligence, if it is to be effective, must be applied generally. The absolute prevention of reproduction in all mental defectives in any parent group may be expected to have less influence on the frequency of mental deficiency in the next generation than a considerable reduction in the fertility of the large group of borderline and dull-normal individuals. Similarly, selection for leaders or persons of rare creative ability could be best effected by an increase in the frequency of the class of superior and very superior families from which genius is largely recruited. In short, effective genetic selection for intelligence must be applied all along the line, rather than merely to individuals at the extremes.

6. *Conclusions*

We have sought to review the best evidence now available on group differences in hereditary capacities for intelligence with caution but also with candor. We believe that, although the evidence considered does not amount to scientific demonstration at any point, converging lines of evidence do establish some important results that can be regarded as having "moral certainty," that is, as having sufficient probability of validity to be taken seriously into account in social planning.

1. There is evidence that scattered rural communities in many Eastern states in areas that are economically handicapped and that have long been situated so as to make migrations to other localities easy may be characterized by an accumulation of families with inferior capacities for intellectual development and high frequency of mental deficiency.

2. There is, at present, no decisive evidence on variations in genetic capacity for intellectual development among large regional groups. The differences in rates of reproduction between these groups are so large that the question of their genetic capacities deserves far more study than it has yet received. Attention should also be directed to the study of selective

periment is that it does not make possible a strict analysis of the processes involved. The exact "infant mortality rates" applied are not numerically reported but are graphically represented. The authors state, "the assumption has been made that low intelligence is slightly unfavorable to survival. This seems to the writers a very reasonable assumption, but reasonable or not it undoubtedly has an important bearing on the results." The assumption, as stated, is certainly reasonable, but inspection of the infant mortality graph seems to indicate rates ranging from 10 to 20 per cent in the case of the I.Q.'s below 90, about 5 per cent in the I.Q. group, 110–119, about 1 per cent in the I.Q. group 120–130, and absolute survival in the higher ranges. Such differences can hardly be described as "slight." The authors assumed a low correlation between I.Q. and fertility ($r = -.17$). It does not seem to be impossible, therefore, that the high infant mortality rates used in the experiment may have resulted in a negligible or even a slightly positive reversed correlation between numbers of surviving children and intelligence. It is equally likely, however, that unrecognized factors were introduced in some less obvious ways. If some such influences entered in, producing a net effect opposite in direction to the small negative correlation between intelligence and fertility explicitly introduced, the high degree of homogamy assumed to be at work may have magnified their effect, giving the net result as reported.

processes that may now be at work affecting the character of migrants to and from different regions, in view of the fact that some of these regions are likely to be characterized by high natural increase for a long time, whereas in some other areas families are likely not to have enough children to replace the adults of the present generation.

3. In view of the ambiguity of the results obtained in the most critical studies on this subject, we believe it wise absolutely to reserve judgment about the comparative hereditary capacities of large racial groups. Practically, suspension of judgment on this issue is made easier by the consideration that there are at present no great differentials in reproduction rates among large racial or national groups in the United States.

4. There is evidence that the lowest social groups in a typical American or English urban population are significantly below the large middle classes in *average* hereditary capacity for intellectual development. It is also indicated that the professional and upper commercial groups differ from the large middle classes in the frequency of genetic factors favorable to superior and very superior intelligence.

5. There is some evidence that there may be a general hierarchy among broad social groups in *average* capacities for intellectual development. The specific evidence in support of this position is very meager; but if the conclusion stated in the previous paragraph is valid, this conclusion might be expected to follow by analogy. In any case, however, average differences in capacity for intelligence as associated with social status must be small within the broad middle classes which make up the large majority of American urban population.

6. In no case has any considerable body of scientific material been found which leads directly to an inference of important differences in hereditary capacity running counter in direction to present levels of cultural-intellectual development.

7. In so far as group differences in genetic capacity for intelligence may be established, our consideration of genetic principles indicates that differential reproduction among these groups would affect the distribution of genetic capacities in the whole population. A relatively slight increase in the reproduction rate of the groups with the higher average capacity for intelligence and a relatively slight decrease in the reproduction rate of the groups with the lower average capacity for intelligence would very largely increase the number of individuals of high capacity, and very largely decrease the number of feebleminded. Present trends are producing the opposite result.

PART IV

THE CAUSES AND CONTROL OF POPULATION TRENDS

CHAPTER XI

PHYSICAL AND MEDICAL FACTORS AFFECTING FERTILITY

In the preceding chapters we have found that there are large variations in rates of reproduction among various population groups, but we have not tried to find out why these differences exist. In this chapter and the next we will consider studies which may throw light on the causes of these variations.

It is often difficult, in analyzing the factors which control differential fertility, to distinguish clearly between effects of variations in fecundity (physiological capacity to produce living children) and the effects of voluntary limitation. There has been much controversy on this point, and in order to simplify the presentation, we will discuss this question first.

1. *Limited Fecundity versus Voluntary Limitation of Fertility*

Data collected between 1918 and 1928 under the direction of Katherine B. Davis, General Secretary of the Bureau of Social Hygiene, include important materials on factors influencing families of superior social status. Reports on a wide variety of personal items were obtained from 1,000 married women, as well as from a somewhat larger number of unmarried women. Elaborate provisions were taken to assure anonymity. The questionnaires were circulated through several women's organizations of high standing, under circumstances which encouraged maximum coöperation. The original analysis of these data was presented by Davis, 1929, *Factors in the Sex-Life of Twenty-Two Hundred Women.*

The study of factors influencing fertility was incidental to the main purposes of the original study. The data on this point, therefore, are not worked out with explicit reference to age at marriage, age at time of report, and size of family. Through the very generous coöperation of the American Social Hygiene Association, the original data have been placed at our disposal in order to make possible a supplementary analysis with reference to these variables.[1]

All returns received from married women aged 40 to 64 at the time of the report, with certain specified exceptions, were selected for this purpose.[2]

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[1] The questionnaires, after the publication of the report, were placed in the custody of the American Social Hygiene Association.

[2] The rejected records are of those who were aged forty or over at first marriage, or who had been separated (widowed or divorced) during two years or more prior to forty years of age, or who had been married less than four years at the time of the report, and 7 records (otherwise usuable) in which the questions regarding family limitation were not answered. The 7 records last mentioned comprise: three one-child, one two-child, two three-child, and one five-child families.

This selection provided records from 308 married women who had nearly or wholly completed childbearing, and who gave specific information concerning use of contraceptives, artificial abortions, and other relevant items. The sample may be accepted as representative of a class of women who have enjoyed superior education. Seventy-six per cent reported attendance at college, normal school, or other courses beyond high school. Apparently, as indicated by a follow-up study, few of those who failed to respond to the original inquiry were deterred by any sort of bias against the investigation. The large majority of the failures to reply are attributed to neglect or accidental circumstances. There is no reason to suspect any selective bias as regards fecundity except that typical of the social class here represented.

The questionnaire covers eight pages.[3] The present investigators are impressed with the extraordinary completeness and faithfullness of the reports. Unfortunately, however, the forms do not include explicit inquiries about spontaneous abortions, miscarriages, stillbirths, or children dying in infancy, although explicit inquiry was made about artificial abortions. Information on these items is frequently volunteered in reporting number of pregnancies, or appears in answer to other questions, for example, questions concerning health. There remains an excess of 172 pregnancies which are not accounted for either as "children" or as "artificial abortions" (*see* Appendix S). Incidental comments indicate that the majority of these should be attributed to spontaneous abortions, miscarriages, or stillbirths; but a number that cannot be exactly determined should be attributed to loss of children by death between birth and the time of the report. A loss by death of 10 to 15 per cent of all children born alive, prior to the reports, would be reasonable expectation for this group.[4] This would represent an estimated total of from 70 to 108 losses by death of children between birth and time of the reports. Only 26 such losses are mentioned. Therefore, in 44 to 82 cases, the pregnancies not otherwise accounted for may represent children born alive but not living at the time of the report, and therefore not mentioned in giving "age and number of children." Even at the higher expectation of deaths, which is probably very excessive, there would remain a total of 90 spontaneous abortions, miscarriages, or stillbirths per 720 live births, or 12.5 miscarriages per 100 live births.[5] Our data on this point are extremely vague; but these data seem to indicate that accidental abortions, miscarriages, and stillbirths are at least as great a source of reproductive loss as childhood mortality, perhaps much greater, for the type of families represented in this sample. In so far as superior health conditions may reduce the frequency of spontaneous abortions, miscarriages, and stillbirths, health may have a direct and important causal relation to fertility.

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[3] Questions in the Davis inquiry that are of special interest for our purposes are as follows:

- Age
- Age at marriage
- Age of husband at marriage
- If a widow state period of widowhood
- Education: At what grade did your schooling end?
  - Primary; grammar; high; college
- Were you engaged in any gainful occupation before marriage?
- Were you engaged in any gainful occupation outside the home during marriage?
- Your health up to time of marriage?
- Your health since marriage?
- Have you had any pelvic surgical operations?
- If so, name them exactly.
- Number and age of children
- Number of pregnancies
- Have you at any time for any reason been led to use measures for the prevention of pregnancies?
- What were your reasons or motives?
- What means did you use?
- Have you ever had artificial abortion performed? How many? Method? Reason?

Attention will also be directed at a later point in this chapter to certain data on sex habits and on attitudes toward sex relations in marriage, as bearing on possible causes of sterility.

[4] According to *United States Abridged Life Tables, 1919–1920*, 86.8 per cent of all white males and 88.9 per cent of all white females, born alive, survive to the tenth year. The majority of births reported above occurred before 1920 but the social status and maternal care of this group may be presumed to be above the average for all white families.

An analysis by numbers of children reported is given below with distinction between "natural" and attempted "voluntary" limitation. "Voluntary limitation" is here used to include all cases giving an affirmative reply to the question regarding "measures for the prevention of pregnancy"—except exclusive reliance on so-called "safe periods," [6] but including cases reporting artificial abortions, incomplete intercourse (coitus interruptus) or abstinence where specified as a measure designed to prevent pregnancy. "Medical abortions," in the case of operations indicated because of specific genital disorders (tumors, extra-uterine conceptions, and so forth) are not included as contraceptive measures. Premarital use of contraceptives and premarital abortions are also excluded from consideration, in order to restrict the analysis to conditions influencing marital fertility. The results of this analysis are given in Tables 91 and 92.

Perhaps the most interesting result of this analysis is the variation in resort to artificial limitation in relation to size of family. Among the childless couples, only 37 per cent appear as "voluntarily limited"—including several cases of the "temporary" use of contraceptive measures, influenced by circumstances affecting health, special periods of economic anxiety, or the intent to postpone conception until a year or two after marriage. If these cases reporting temporary use of contraceptives are deducted, only 25 per cent of all couples in this sample who are without children can be described as voluntarily childless. Nearly two-thirds of the childless families in this sample have never used contraceptive measures, and three-fourths of all

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[5] "Numbers of children," as reported, will be used in the analysis of causes of family limitation. The reader will bear in mind that an indeterminate proportion (estimated as between 7 per cent and 12 per cent) of children born alive in these families but dying at an early age, are omitted in our records. It is therefore probable that about a tenth of these families really had more children born alive (but dying in infancy) than are indicated in our analysis. It should be noted, however, that this consideration could not affect appreciably the class of childless women, because the records for this group, except in two cases, give complete account of the outcome of all pregnancies.

[6] The "safe period" most commonly accepted at the time of this report includes that portion of the menstruation cycle now regarded as a period of maximum fertility.

TABLE 91

Distribution of 308 Wives, Aged 40 or Over at Time of Report, According to Age of Marriage, Numbers of Children Reported, and "Natural" Versus "Voluntary" Limitation of Family. Davis Series

Age of Wife at Marriage	Number of Children and Apparent Character of Limitation																
	0		*1*		*2*		*3*		*4*		*5*		*6*		*7*		*Total*
	Nat.	*Vol.*	*Nat.*	*Vol.*	*Nat.*	*Vol.*	*Nat.*	*Vol.*	*Nat.*	*Vol.*	*Nat.*	*Vol.*	*Nat.*	*Vol.*	*Nat.*	*Vol.*	
16–24	9	2	6	11	2	17	4	17	0	11	1	7	1	0	0	1	89
25–29	11	8	8	9	4	25	5	29	2	18	0	5	0	0	0	1	125
30–34	9	7	4	10	7	14	4	3	0	5	0	0	1	1	0	0	65
35–39	9	5	4	3	4	2	0	2	0	0	0	0	0	0	0	0	29
Total	38	22	22	33	17	58	13	51	2	34	1	12	2	1	0	2	308

TABLE 92

Percentage Distribution of 308 Wives Aged 40 or Over at Time of Report, According to Age of Marriage, Numbers of Children Reported, and "Natural" Versus "Voluntary" Limitation. Davis Series

Age of Wife at Marriage	Number of Children and Apparent Character of Limitation												
	0		*1*		*2*		*3*		*4*		*5 or More*		*Total*
	Nat.	*Vol.*	*Nat.*	*Vol.*	*Nat.*	*Vol.*	*Nat.*	*Vol.*	*Nat.*	*Vol.*	*Nat.*	*Vol.*	
16–24	10	12.2	6.7	12.4	2.2	19.1	4.5	19.1	—	12.4	2.12	9.0	100
25–29	8.8	6.4	6.4	7.2	3.2	20.0	4.0	24.0	1.6	14.4	—	4.0	100
30–34	13.8	10.8	6.2	15.2	10.8	21.5	6.2	4.6	—	7.7	1.5	1.5	100
35–39	31.0	17.2	13.8	10.4	6.9	—	6.9	—	—	—	—	—	100
All ages	12.3	7.1	7.1	10.7	5.5	18.8	4.2	16.6	0.6	11.0	1.0	4.9	100
Cumulative percentage, all ages:													
Natural limitation	12.3		19.4		25.0		29.2		29.9		30.8		30.8
Voluntary limitation	7.1		17.9		36.7		53.2		64.3		69.2		69.2

childless couples have wanted to have children, at least during some portion of their married life. It appears then that only 5 per cent of all families in this sample were voluntarily childless. On the other hand, over 90 per cent of the families with four children or more, in this group with superior educational advantages, have used some means to limit childbearing.

In order to give some idea of the comparative importance of involuntary and voluntary factors in causing small families, we may weigh the factors in proportion to the "distance," in number of children, of each small family from a family of four children (*see* Table 93).

We may summarize this analysis as follows: "natural limitation in fecundity" appears responsible for over 40 per cent of all reduction in fertility below a four-child level, due chiefly to its importance in causing childlessness; family limitation specified as "temporary" may, or may not, have been responsible for the final reduction in size of family when such

TABLE 93

Factorial Analysis of "Natural" Versus "Voluntary" Limitation in the Case of 255 Small Families (i.e. Families with Less than 4 Children). Davis Series

Size of Family by Number of Children Reported	No Voluntary Limitation of Births			Temporary Limitation of Births			Voluntary Limitation of Births Not Specified as Temporary			All Cases		
	Number of Cases	*Weight* [a]	*Number × Weight*	*Number of Cases*	*Weight* [a]	*Number × Weight*	*Number of Cases*	*Weight* [a]	*Number × Weight*	*Number of Cases*	*Weight* [a]	*Number × Weight*
0	38	4	152	7	4	28	15	4	60	60	4	240
1	22	3	66	3	3	9	30	3	90	55	3	165
2	17	2	34	6	2	12	52	2	104	75	2	150
3	13	1	13	4	1	4	48	1	48	65	1	65
Unweighted totals:												
Number	90			20			145			255		
Distribution	35.3%			7.8%			56.8%			100%		
Weighted totals:												
Number			265			53			302			620
Distribution			42.7%			8.5%			48.1%			100%

[a] Weight equals distance (in number of children) of specified number of children from *four.*

limitation is reported; in any case, less than 50 per cent of total reduction in fertility in this sample below the four-child level could be attributed to contraceptive practices admittedly adapted to effect such limitation—even on the hypothesis, which we will soon find to be far from the truth, that all attempts at contraception are perfectly effective.

An interesting comparison is possible between the proportions of families which are "naturally limited" to 0, 1, or 2 children in this recent American sample and the proportions of families of the same sizes in the general population of England in marriages prior to 1871, as reported by surviving couples in the census of 1911, reviewed in the Registrar General's study of *Fertility of Marriage* (Great Britain, 1917, 1923). The Bradlaugh-Besant trial, 1877, marked the beginning of the widespread circulation in England of tracts on contraceptive methods (Himes, 1932). The birth rate in England first began to show a constant decline at about the same time (Thompson, 1903, p. 86). Gradual decline before this time may, however, have been concealed by a corresponding improvement in registration statistics. Considerable decline in birth rates appeared in France from the beginning of the Nineteenth Century; and ratios of children to women in the United States also show a steady decline throughout the Nineteenth Century, gradual at first and then more rapid. It is natural to suppose that the relatively small amount of artificial control of births in England during the sixth and seventh decades of the Nineteenth Century would have been directed almost wholly to the alleviation of the hygienic and economic strain of frequent pregnancies and very large families, or to the prevention of conception in the presence of serious health difficulties, or to the prevention of conception in extra-marital relations. In short, we may presume that few families in marriages formed prior to 1876 were voluntarily limited to families of 0, 1, or 2 children. Moreover, if we neglect exceptional cases of little statistical import, it is likely that strict limitation to very small families was largely confined to families influenced by urgent health considerations or other compelling motives.

If the specific averages for numbers of children ever-born to wives married at different ages in England, 1861–1871, are applied to a theoretical population with the age distribution at marriage observed in the Davis series (Bureau of Social Hygiene data), we are able to gain some insight into the nature of recent changes in size of family.[7] The results of this experiment are shown in the accompanying diagram (*see also* Appendix S).

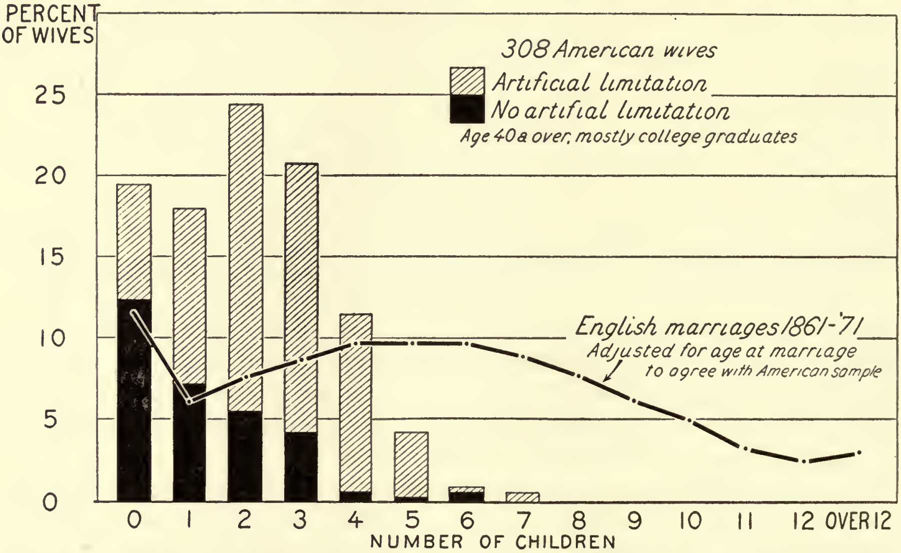

FIG. 50. A COMPARISON BETWEEN FAMILIES IN A RECENT AMERICAN SERIES AND FAMILIES EXPECTED ON BASIS OF AN EARLIER ENGLISH SERIES. Percentage distribution of 308 American wives according to numbers of children, and according to statements regarding use or non-use of contraceptives. (Upright bars.) Percentage distribution of English wives married in 1861–1871, according to number of children, adjusted for age at marriage, so as to represent conditions in a sample with the same ages at marriage as in the American sample. (Broken line.) American data collected by Davis, about 1925. English data from census of 1911. *See also* Appendix S.

The distribution of families "naturally limited" to 0, 1, or 2 children in the Davis series shows a striking similarity to the distribution of equally small families in the early English sample. In the Davis series, about 25 per cent of all marriages are here classified as naturally limited to less than three children; but in a sample of earlier English marriages, matched for wives' ages at marriage, there would be found an equal limitation to families of less than three children due to all causes. This finding supports the hypothesis that in English marriages formed prior to 1871 there was little attempt artificially to limit families to less than three children. It also indicates that when differences in ages of wives at marriage are taken into account there has, apparently, been no change in the fecundity of married couples during the last half-century, although there has been a large decrease in the fertility of marriages during this period. Our tentative conclusions may then be summarized as follows.[8]

---

[7] It is possible that survival to advanced age may have been related to fertility, but if so the direction of this relationship is not clear. It is possible that sterile couples tend to be unhealthy couples and therefore fail to survive. On the other hand, it is possible that the mothers of large families are less apt to survive because of the effects of repeated childbearing. On this problem, *see* Notestein, 1931, "The Decrease in Size of Families from 1890 to 1910," *Quarterly Bulletin of the Milbank Memorial Fund*, Vol. 9, p. 186: "An opinion that there is a direct association between fertility and the length of life after the end of the childbearing period is expressed by Karl Pearson and G. Udny Yule in the *Proceedings of the Royal Society of London*, lxvii, pp. 159ff. However the evidence adduced does not seem conclusive, since it rests on the assumption that there was no secular trend in the size of the families whose genealogical records furnish the data for the study."

1. Somewhat more than one-fourth of the couples represented in a sample of 308 American wives of superior social status (married in large part around 1900) appear *involuntarily* limited to less than three children, because some of those who used contraceptive methods to effect family limitation were presumably limited in fecundity. Among these couples that were limited in fecundity, about half (12 per cent or more of the total) were sterile. More than 7 per cent of the total were apparently limited involuntarily to one child only. It is possible that there may be slightly less limitation of fecundity among more recently married couples of similar social status, because of an apparent trend toward somewhat earlier marriage. But this change may be offset by more frequent voluntary initial delay in childbearing.

2. Frequencies of 0, 1, and 2 child families in English marriages formed prior to 1871 may be used as an approximate index of expected frequencies of involuntary or quasi-involuntary limitation to very small families at specific marital ages in more recent marriages. On the basis of the evidence here examined, there does not appear to have been any recent increase in the frequency of involuntary sterility, at specific marital ages, in recent American marriages as compared with English marriages before the introduction of the "small family system."

3. Involuntary sterility and limited fecundity is an important factor in determining reproduction rates, but recent conspicuous changes in birth rates must be attributed to social factors.

2. *Causes of Sterility*[9]

The idea that age at marriage or mode of living may seriously influence capacity to bear children is inconsistent with the popular conception of fertility as an all-or-none trait, but is in line with the more advanced medical approach to the problem.

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[8] These conclusions are, in general, supported by various statistical studies of the age conditions and changes in type of family involved in declining birth rates, notably the English Registrar General's study of *Fertility of Marriages*, and J. Sanders' study of *The Declining Birth-rate in Rotterdam*.

[9] No attempt is made in this section to deal extensively with the medical aspects of sterility, but merely to take account of certain aspects of the problem which are important for population theory.

According to Meaker, 1929, *absolute sterility* (no production of ova, no production of spermatozoa, or obstruction such as to prevent absolutely access of spermatozoön to ovum), is present only in about 30 per cent of all sterile human matings. On the other hand, some unfavorable factors are present in many normally productive couples:

> "The human being is, comparatively speaking, a poor breeder, rarely if ever attaining what might be called absolute fertility, or biologic perfection of the reproductive function. Most couples who succeed in demonstrating their fertility do so in spite of certain more or less unfavorable conditions, the nature and extent of which determine the fecundity of the mating.
>
> "There are all degrees of relative fertility, as there are of relative sterility . . .
>
> "Whether a mating proves relatively sterile or relatively fertile depends solely and entirely upon whether or not the sum-total of adverse factors in the two partners is enough to depress the fertility of the mating below the threshold of conception . . .
>
> "The complete investigation of sterility demonstrates in no uncertain way that the etiologic sum-total is made up of multiple factors" (pp. 750–751).

According to this author, about one-third of all demonstrable causal factors in sterility are on the male side, and two-thirds on the female side, although unfavorable conditions on the female side frequently result from infections transmitted by the male. "In more than 90 per cent of clinical cases, however, there is some division of responsibility between the two partners." In the male, unfavorable constitutional factors appear more frequently than local conditions. Local factors are more frequently apparent in the female, including developmental arrests, mechanical interferences with ovulation, stricture of Fallopian tubes, and hostilities of endocervical secretions. Hereditary disorders, endocrine malfunction (especially pituitary disorder), infection (especially gonorrhea), or malnutrition may be fundamental in causing these conditions. Gonorrhea is an important factor in absolute sterility, as, to a lesser extent, is syphilis. These diseases, however, are probably not as important as frequently supposed, especially in the case of well-educated families, with superior medical facilities, where the problem of involuntary sterility seems to be most acute.

The conception that fertility is a relative condition of the two mates was clearly set forth by Reynolds and Macomber, in 1924, on the basis of animal experimentation and clinical experience:

> "By a long series of rematings first with rats of proved fertility, then with those of proved lesser fertility, it was possible to determine the degree of fertility of each individual with a degree of accuracy which proved to be sufficient for all our further purposes. This was accomplished by comparing results of all the matings of each rat under a system of trial and error, in which the result of each mating altered the status not only of that rat, but of all its partners, and successively of all their partners through the series. By each successive applica-

> tion of this principle the errors became less, and in the end the results were approximately accurate.
>
> "All the individual fertilities were expressed in percentages, and when they were all added together and divided by the number of rats concerned it was found that the average individual fertility of the males and females was the same—approximately 0.82. It will be remembered that the average mating fertility of the entire series was 0.65. On a mere inspection of these figures it was at once noticed that if the average individual fertility of the females was multiplied by the average individual fertility of the males the product would represent the average mating fertility of the whole series (0.8×0.8=0.64), and this suggested that if the calculated individual fertilities of any two rats were multiplied together the product might prove to represent the fertility of their particular mating . . ." (pp. 158–159).

The results finally obtained, after a more extended investigation, showed a distribution running as follows:

Individual Fertility	Zones of Fertility of Matings	Mating Fertility
1.00×1.00	Always fertile	1.00
0.9 ×1.00		0.90
0.9 ×0.9		0.81
0.8 ×0.9		0.72
0.8 ×0.8		0.64
0.7 ×0.8	Doubtful	0.56
0.7 ×0.7		0.49
0.5 ×0.9		0.45
0.7 ×0.6		0.42
0.6 ×0.6	Always sterile	0.36
0.8 ×0.4		0.32
0.5 ×0.5		0.25
0.8 ×0.2		0.16

> "It was judged safest to abandon the theory of a threshold of fertility and to divide the table into three zones. The principle arrived at may probably be safely stated in the form that 'A mating with a predicted fertility above 0.60 will be fertile, while one which is calculated as below 0.40 will be sterile, but that between 0.40 and 0.60 there is a doubtful zone in which either result may occur.'
>
> "The predicted results were as true to those actually obtained, when the partners were of different fertilities, as when their fertilities were the same. . . .
>
> "The results were equally accurate whether the animal with the better percentage was male or female. . . .
>
> "As a further result of these experiments it became evident that we shall add greatly to the clearness of our conception of the whole subject of fertility if we cease to think of any mating or of any individual as necessarily either fertile or sterile, and realize instead that the fertility of either an individual or a mating may vary in any degree between full fertility and absolute sterility. This change of thought is of perhaps more practical importance than any other factor in this recent great advance in knowledge of fertility.
>
> "These principles are now probably regarded as fully established for the domestic animals by those who have followed the results of experimental work in the animal laboratories and the agricultural experiment stations, and several years of careful clinical observation have now convinced us personally that they are equally applicable to the human race" (pp. 160–162).

Variations in spermatogenesis are the most important factor in male responsibility for sterility. Macomber and Sanders, 1929, emphasize frequency, or concentration, of spermatozoa per unit of seminal fluid. The modal number of spermatozoa is apparently about 100 million per cubic centimeter, and a concentration as low as 60 million is regarded as making conception very improbable. Moench and Holt, 1931, emphasize variations in sperm head formation.

> "The sperm head is the greatest single source of information as to the fitness of these cells for reproduction, and . . . in average cases, the relative number of abnormal sperm heads affords an index to the reproductive fitness of the individual. This must mean that a disturbance of spermatogenesis is present which affects all the sperm cells, but that only the more grossly deformed ones are visible, because our microscopes are too crude an instrument to detect slight changes . . .
>
> "When the sperm head abnormalities reach 20 to 25 per cent, impaired fertility can be assumed. When the sperm head abnormalities are above 25 per cent, clinical sterility is usually present" (pp. 203, 210).

Glandular malfunctions apparently play a very large rôle in producing female conditions unfavorable to fertility. Such disturbances are reported in 25 per cent of 506 cases of female sterility described by Mazer and Andrussier. In a group of 103 cases in which male sperm motility has been established and occlusion of Fallopian tubes and other specific conditions of female generative tract except hypoplasia eliminated, pituitary malfunction is reported in 61 cases and primary ovarian glandular malfunction in 15 others. The rôle of glandular functions in fertility is reviewed in a symposium edited by Edgar Allen, 1932.

Recognition of the plurality of factors involved in human reproduction adds plausibility to the hypothesis of a decline in reproductive capacities among civilized peoples, advanced in various forms by Gini, Fisher, Hankins, and others.[10] The complexity of the problem and the paucity of controlled data, however, seem to make it impossible to come to an exact conclusion on this subject at present.

On a priori grounds we might expect differences in fecundity between ethnic groups, due to hereditary factors, and between social groups, due to the physical effects of different modes of life and differences in exposure to disease. More evidence regarding fertility among different primitive groups, controlled with reference to variations in sexual practices, might throw much light on ethnic variations in fecundity. Variations between individual matings are obvious and we may assume, on the basis of experimental work with animals, that such variations are, in part, hereditary. It is difficult to establish this relationship in human populations because of the difficulty of eliminating social influences.

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[10] Gini's thesis moves in broad generalities, positing cycles of population growth and decline due to variations in fecundity. Fisher presents a statistical treatment of data on English nobility to show the inheritance of fecundity. Hankins does not posit hereditary decline in fecundity but rather decrease in the fertility of marriages due to changes in social life affecting frequency of sexual intercourse, general physical vigor, specific diseases, and so forth. *See also* Wagner-Manslau's study of data on the fertility of European nobility.

Pearl (*Biology of Population Growth*, p. 202) has presented data to support the theory that men engaged in outdoor activity (39 farmers) may have greater sexual vigor than business executives (67 merchants and bankers) or professional men (68 cases). The data were obtained by questionnaires and correspondence from men aged 60 or over who had been treated for benign hypertrophy of the prostate gland. At all ages the average frequency of sexual activity is higher in this series for the farmers than for business men, and higher for the business men than for the professional group. The differences between groups are most marked at the age period 20–29 years, but this may be influenced by a higher proportion of early marriages among the farmers.[11] The differences at other ages are not large and their statistical significance is doubtful. At ages 30–39 years the reported average frequencies of coitus per month are: for the farmers, 14.8±1.3; for the merchants and bankers, 13.7±1.2; for the professional men, 11.8±8. At ages 40–49, the corresponding frequencies, as reported, are: for the farmers, 13.7±1.3; for the merchants and bankers, 11.5±.8; for the professional men, 10.1±.7. There are many uncertainties about these results. One group may have been more accurate, or more modest, in reports. Anyway, the results seem reasonable. Unfortunately, the writers know of no other studies which bear directly on the possible variations in sexual interest and vigor among occupational groups in relation to their variations in fertility.

The writers made a cursory examination of the data in the Davis series in a search for any apparent relationship between sterility and (1) frequency of marital intercourse, (2) sex practices prior to marriage, (3) education, or (4) sex adjustment within marriage. For this purpose a comparison was made between a sample of "sterile marriages" (25 sterile marriages, exclusive of 12 cases in which specific pathological factors were reported sufficient to cause absolute sterility) and two samples of "fecund marriages" (with about 50 marriages of proved fecundity in each sample). In view of the very small numbers available and the absence of any exact gynecological data, the results of this analysis must be regarded as having, at best, merely suggestive value.

> 1. High, low, and normal frequencies of sex intercourse in marriage appeared among the sterile as well as among the fertile marriages in this series, with no significant difference.
>
> 2. Comparing the sterile with the fertile marriages, auto-erotic practices after puberty were reported in 28 per cent of the sterile marriages, in 22 per cent of the 51 marriages voluntarily limited to 3 children, and in 35 per cent of the 51 marriages with 4 to 6 children. Some attachments to other women, recognized as involving sexual emotion, were reported in 12 per cent of the sterile marriages, 18 per cent of 51 marriages voluntarily limited to 3 children,

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[11] Pearl apparently does not take marital condition into account in the comparison between occupational groups.

and 14 per cent in 51 marriages with 4 to 6 children. Embraces or petting with others than fiance, prior to marriage, were reported by wives in these three groups as 24 per cent, 32 per cent, and 36 per cent, respectively, i.e., slightly higher in the case of marriages of proved fecundity than in the case of sterile marriages.

3. Differences between these groups in percentages of college graduates are not significant, except possibly the slightly smaller proportion of college experience reported by women with 4 to 6 children, as compared with infertile marriages or marriages voluntarily limited to less than 4 children.

4. Some evidence was found of a possible relationship between psychological adjustment in marriage and fecundity. The original questionnaires included a series of questions which made possible a fairly definite though subjective classification of each case into one of the following types, as regards wife's reaction to sex in marriage:[12]

1. Positive
2. Doubtful (Statement of pleasurable response, with some qualifications, or qualifying factor, including cases in which intercourse rarely occurred oftener than once a month).
3. Mixed (Statement of pleasurable response, combined with some pain, or statement of the type "sometimes pleasurable, sometimes neutral, sometimes distasteful").
4. Neutral (Statement of the type: "neutral" or "pleasurable but only because of giving happiness to husband").
5. Negative (Distasteful, as predominant response).

A clearly positive response to sexual relations in marriage is reported in about one-fourth of sterile marriages, in about one-half of the marriages "naturally" limited to one child, in about the same proportion of marriages voluntarily limited to three children, and 60 per cent of the marriages with four children or more. A definitely negative reaction to the sex side of married life is reported by 20 per cent of the wives in the sterile marriages, by 12 per cent of the wives in the marriages naturally limited to one child only, but in only 6 per cent of the apparently fecund unions (families voluntarily limited to three children, or families with four children or more)—*see* Appendix S. Because of the small numbers of sterile marriages (25) and marriages naturally limited to one child (17), little reliance can be placed in these results. But there is a suggestion that happy sexual life is positively correlated with fecundity, although happy unions may be sterile, and very negative attitudes toward sex may exist in the case of married partners who are fecund.

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[12] The questions evoking the responses on which this classification was based were as follows:

Were you attracted or repelled by the manner in which married sex relations came into your experience?

Have you found your married relations pleasurable, neutral, or distasteful?
(a) In earliest period? (b) Middle period? (c) Later period? If distasteful, why?

To what extent are you able in normal sex intercourse to experience sex pleasure and the sexual climax?

Can you compare your sex impulses and satisfactions, in degree of intensity, with those of your husband?

How has the frequency of your desire for sex intercourse compared with that of your husband, especially during the first few years of marriage?

On an average how frequently has sex intercourse taken place between you and your husband?
(a) During early years of marriage? (b) After eight or ten years (if married that long)?

Robert L. Dickinson, Chairman of the National Committee on Maternal Health, is convinced, on the basis of a long experience as a gynecologist and extensive study of all phases of human fertility, that psychic factors are responsible for much apparent physiological sexual incompatibility and that they frequently have an important influence on capacity to bear children (Dickinson and Beam, 1931, p. 267). Painful intercourse (*dyspareunia*) is reported by Dickinson as occurring much more frequently among childless women, in his clinical experience, than among women who have borne children. There is, of course, the possibility that the dyspareunia and the childlessness may both be symptoms of disturbances which are primarily physiological in origin. In Dickinson's opinion, however, the psychic factors are frequently fundamental.[13]

We conclude that psychic factors related to negative response to sex in marriage may possibly be a factor in causing sterility, although probably a relatively minor factor. If so, such psychological conditions are probably not much influenced by formal education, but refer primarily either to hereditary variables or to early home conditioning.

It is probable that differences in age at marriage are chiefly responsible for any differences that may exist between social classes in ability to reproduce. But it is also possible that other differences in attitudes and habits, affecting the frequency and character of marital intercourse, may also tend to cause some minor differences between social groups, as regards fecundity.

Much more extensive research on the "positive side of birth control" is obviously demanded, in order to establish the relative importance of various factors in sterility and to discover effective therapeutic measures. The problem is one of great importance, both because of immediate human happiness which may be released by its solution, and because of the social loss of reproductive capacity among persons otherwise qualified and eager for parenthood.[14] We have suggested that variations in ability to complete pregnancy successfully in the birth of living offspring may have a large influence on variations in fertility. It is generally recognized that good health is important in the prevention of miscarriages and in effecting ease of delivery, although the relation of general health to ability to become pregnant is less certain.[15] The most important aids to fertility which can be practiced at present by the lay public would appear to be general hygiene, avoidance of specific infections, early marriage, and consultation with specialists in this field if pregnancy does not occur in the early years of married life.

[13] Among 158 cases of women reporting dyspareunia, 51 per cent were never pregnant, 7 per cent were pregnant but unable to bear offspring alive, and only 42 per cent had borne living children, whereas among 315 women with normal marital adjustment, married 9 months or more, 23 per cent were never pregnant, 9 per cent reported abortions only, and 68 per cent had borne living children.

[14] Stein and Leventhal, 1932, reporting in the *Journal of the American Medical Association*, describe success in dealing with about 20 per cent of 300 sterile marriages, chiefly where conditions were observed which could be remedied by surgical treatment. Other physicians have reported somewhat similar results, on the basis of present knowledge and procedures.

[15] *See* Hotelling and Hotelling, 1931 (Bibliog., Chapter XII).

3. *Age of Marriage in Relation to Fertility*

Data on numbers of children ever-born in relation to specific wife's age at marriage as reported for all English couples married prior to 1871 and surviving in 1911 are shown in Table 94. We have already given reasons for supposing that the percentage frequencies of no-child, one-child, and two-child families in this series represent, for the most part, corresponding limits in fecundity.[16] Data on distributions of wives' ages at first marriage for several occupational classes in a large sample of native whites of native parentage, married between 1900 and 1905, and living in the Northern portion of the United States (the Milbank sample of census schedules, 1910) are shown in Table 95.

These two sets of data are combined in Table 96 to indicate the frequency with which no-child families and families with only one or two children might be expected in different American social classes, if such infertile marriages occurred at the specific frequency rates prevailing in the general population of England prior to 1871.

TABLE 94

Percentage-Frequencies of Numbers of Children Born to Surviving Couples, England and Wales, 1911, by Date of Marriage, 1851–1871, and by Wife's Marriage Age *

Wife's Marriage Age and Date of Marriage	Percentages of Families of Each Size by Number of Children Ever-Born						
	Families with Less than Three Children				*Families with 3, 4, or 5 Children*	*Families with 6 or More Children*	*All Sizes*
	No Child	*1 Child*	*2 Children*	*Total*			
15–19 1851–1861	4.0	2.5	3.1	9.6	12.9	77.5	100
20–24 1851–1861	5.9	3.2	4.0	13.1	17.1	69.8	100
25–29 1851–1861	8.6	4.1	6.0	18.7	26.4	54.9	100
30–34 1861–1871	15.8	7.5	10.7	34.0	41.1	24.9	100
35–44 1861–1871	29.9	16.9	17.0	63.8	29.0	7.2	100

* Abridged from Table XVI, *Census of England and Wales, 1911*, Vol. 13, p. xlii.

It appears that differences in wife's age at marriage may account for a fraction, but only for a relatively small fraction, of the large differences in fertility actually found among various social classes in the United States. Attention, up to this point, in studying the relation of age to fertility has

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[16] Marriages of 1861 are used where these afforded sufficient samples. At the older age levels, marriages of 1861–1871 were used.

TABLE 95

Distribution of Wives' Ages at First Marriage in Marriages Formed between 1900 and 1905, Selected Occupational Classes. Milbank Sample of United States Census Data, 1910 *

Wife's Age at First Marriage	Occupational Classes				
	Professional	*Skilled*	*Unskilled*	*Farm Owner*	*Farm Laborer*
15–19	8.2	31.5	39.9	28.7	51.3
20–24	42.5	46.2	37.8	44.5	36.3
25–29	36.2	15.7	14.4	17.7	9.5
30–34	9.5	4.8	4.5	6.0	2.2
35–44	3.5	1.8	3.4	3.1	0.7
Total	99.9	100.0	100.0	100.0	100.0

* Based on data by Notestein, 1931, "Differential Age at Marriage According to Social Class," *The American Journal of Sociology*, Vol. 37, pp. 36–37.

TABLE 96

Distribution of Proportions of Families with Specified Number of Children Expected in Different Occupational Classes on the Basis of Fertility Experience of English Marriages Formed Prior to 1871 and Distribution of Marital Ages of Wives in Each Occupational Class in Milbank Sample of United States Census Data, 1910

Number of Children Expected	Occupational Classes				
	Professional	*Skilled*	*Unskilled*	*Farm Owner*	*Farm Laborer*
0	8.5	6.6	6.8	7.2	5.6
1	4.4	3.6	3.7	3.8	3.1
2	5.7	4.6	4.7	4.9	4.0
3 or more	81.3	85.2	84.8	84.1	87.3
Total	99.9	100	100	100	100

been concentrated wholly on the influence of variations in wife's age at marriage. The husband's age at marriage also has a considerable effect on fertility, but apparently much less than that of the wife. The relation between these two factors, wife's marriage age and husband's marriage age, may be shown by comparing numbers of children born to wives married at ages 22 and 32 to spouses aged 22, 32, or 42 years.

It is apparent that fecundity is negatively correlated with wife's age at marriage, and to a less degree with husband's age at marriage. We have also found evidence that voluntary childlessness is more frequent in later than in early marriages. Even within the fairly homogeneous group of families represented in the Davis series, artificially limited childless families occur more frequently at the higher age levels (*see* Table 91, above). Fear of childbearing becomes an important item in the late thirties. In some cases women who marry late accept husbands who are widowed or divorced, sometimes with step-children. Perhaps most important of all, women marrying at a late age have become adjusted to habits of life which must be seriously disturbed by childbearing. Thus the English data for marriages in successive

TABLE 97

AVERAGE NUMBER OF CHILDREN PER 100 COUPLES, CLASSIFIED ACCORDING TO DATE OF MARRIAGE AND AGE AT MARRIAGE OF HUSBAND AND WIFE, ENGLAND AND WALES, CENSUS OF 1911, SMOOTHED DATA *

Date of Marriage	Husband's Age at Marriage in Years	Wife's Age at Marriage: 22 Years	Wife's Age at Marriage: 32 Years
1865 [a]	22	728	388
	32	654	371
1870 [b]	22	708	358
	32	620	344
	42	563	327 [c]

* From *Census of England and Wales, 1911*, Vol. 13, Pt. 2, p. xxiv. "The data for this table have been smoothed by basing the rates shown not merely on the facts for the marriage ages to which they refer but on those for the groups of five years of marriage age of which these ages form the centers" (*Census of 1911, England and Wales*, Vol. 13, Pt. 2, p. xxi).

[a] Duration of marriage 45–46 years.

[b] Duration of marriage 40–41 years.

[c] Less than 100 cases.

decades during the late Nineteenth Century show a consistent secular increase in the frequencies of one-child and two-child families for all ages of wives at marriage, with a diminution of very large families. No secular increase is found, however, in this series in the frequency of childless families in the case of wives married before 25 years of age (*see* Appendix T).

We conclude that the ages of spouses, especially the age of the bride, at marriage have an important bearing on fertility, both as regards fecundity and as regards attitudes toward voluntary limitation of size of family. Apparently the fecundity of women begins to decline in the late twenties and reaches a low degree before the final limit of the menopause. Both sterility and extreme voluntary limitation increase in frequency with each advance in wife's age at marriage, beyond a point not far from 25 years of age.

4. *Extent of Contraceptive Information and Practice in Various Groups*

An enormous body of data on variations in contraceptive practice as affecting fertility is now being collected under the direction of Raymond Pearl, with aid from the Milbank Memorial Fund. The records used in this study represent consecutive maternity cases, beginning July 1, 1931, or at some later date, in various hospitals in or near large cities east of the Mississippi River. There are no records for patients delivered in hospitals under Catholic auspices; but about 40 per cent of the white women interviewed are Catholics. The procedure is necessarily limited to the experience of women who have become pregnant at least once. The methods are such as to warrant confidence in the accuracy of the reports, except that there may be some understatement of use of contraceptives.[17] The second pre-

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[17] For complete description of research procedure, *see* Pearl, 1932. The second report gives results based on an analysis of the first 5,000 and the last 1,000 cases in a series of 26,000 cases (*see* Pearl, 1934).

TABLE 98

Practice of Contraception in Relation to Race and Economic Status *

A. WOMEN WHO HAVE EXPERIENCED ONE PREGNANCY ONLY

Groups	White				Negro	
	Very Poor *142 Cases*	*Poor* *700 Cases*	*Moderate Circumstances* *595 Cases*	*Well-to-Do and Rich* *146 Cases*	*Very Poor* *74 Cases*	*Poor* *110 Cases*
	Per Cent	*Per Cent*	*Per Cent*	*Per Cent*	*Per Cent*	*Per Cent*
Regular and steady practice of contraception	6.3	15.7	18.5	30.1	6.8	10.0
Contraception intermittent mainly for planned children	8.5	6.3	18.2	37.0	1.4	5.5
Contraception intermittent through carelessness or dislike	4.2	6.0	6.6	8.9	5.4	5.5
No contraception	81.0	72.0	56.7	24.0	86.4	79.0

B. WOMEN WHO HAVE EXPERIENCED MORE THAN ONE PREGNANCY

Groups	White				Negro	
	Very Poor *367 Cases*	*Poor* *1,248 Cases*	*Moderate Circumstances* *759 Cases*	*Well-to-Do and Rich* *209 Cases*	*Very Poor* *272 Cases*	*Poor* *271 Cases*
	Per Cent	*Per Cent*	*Per Cent*	*Per Cent*	*Per Cent*	*Per Cent*
Regular and steady practice of contraception	13.6	17.1	21.9	16.3	9.2	12.5
Contraception intermittent mainly for planned children	15.3	17.5	28.6	55.0	2.6	5.2
Contraception intermittent through carelessness or dislike	9.0	10.4	5.9	8.6	15.1	12.9
No contraception	62.1	55.0	43.6	20.1	73.1	69.4

* Adapted from Pearl, 1934, "Contraception and Fertility in 4,945 Married Women. A Second Report on a Study of Family Limitation," *Human Biology*, Vol. 6, pp. 376–377.

liminary report (May, 1934) supplies certain data for 4,177 white and for 767 Negro married women. The proportions reporting contraceptive practices in different economic groups in this series are shown in Table 98. The groups classified as practicing contraception intermittently "mainly for planned children" include some cases in which the irregularity was attributed in part to neglect or dislike of such practice, but cases in which the interruption was described as definitely for planned children preponderate in this group. The group reported as practicing contraception regularly includes some cases where such practice may have been interrupted, no explicit report on this subject being available. The upper economic Negro groups are omitted here because of the small number of cases in these subgroups. For the whole series, 45.3 per cent of the white women and 25.7 per cent of the Negro women are described as having made some attempt, other than abstinence from sexual intercourse, to control conception.

The variation in the proportions of couples reporting contraceptive practice in different racial and economic classes is strikingly consistent. From the statistical standpoint there can be no doubt about the reliability of the result. Among white women classified as "well-to-do or rich," about 78 per cent of all wives who had been confined once or more are reported as having practiced contraception, and 80 per cent of those who had experienced two or more pregnancies are so reported. These results are similar to those obtained from the Davis series (described above), wives mostly college graduates. In the latter series about 77 per cent of wives aged 40 years or over who had borne one child or more, and 82 per cent of those who had borne two or more children reported contraceptive practices. Using the figures for all wives in the Davis series regardless of age, 78 per cent of those who had been pregnant at least once and 80.5 per cent who had experienced two or more pregnancies stated that they had practiced contraception (*see* Davis, p. 18). The percentages reported by Pearl for women at the other extreme of the social scale, however, do not agree so well with the results obtained in a study of patients attending an obstetrical clinic (*see* Baker, 1933, "The Mental and Social Status of Fifteen Hundred Patients in the Obstetrical Clinic of the Johns Hopkins Hospital"). Baker does not give separate analysis, as regards use of contraceptives, for different economic groups, but her series would appear on the whole to be inferior in social status to the random sample of hospital cases represented in Pearl's series. The dispensary group, studied by Baker, includes "all primiparae, any multiparae with physical complications who are delivered on the wards, and normal multiparae who come to the hospital to make prenatal visits, but who are delivered in their homes through the agency of the outside obstetrical service of the Johns Hopkins Hospital." Nearly half of all the cases in this group were registered with the Social Service Exchange, and the educational status of the group is well below that of the general population. Nevertheless, 60.6 per cent of the white women in Baker's series, in contrast to 45.3 per cent of the white women in Pearl's series, reported contraceptive practice. The discrepancy is smaller in the case of the Negroes, but again the proportion indicated as using contraceptives is higher in Baker's series (30.9 per cent) than in Pearl's series (25.7 per cent). These differences may be due to differences in the composition of the samples used. But, in view of the consideration that all of the patients in Baker's series were interviewed at length by the investigator, a psychiatrist, it is possible that the better rapport established in this procedure elicited more complete and accurate statements regarding sex practices than could be obtained in a large series with brief interviews by many workers, each receiving a small remuneration for each report, especially in the case of patients with inferior education and low economic status. It is, then, possible that true differences in frequency of contraception between social groups may be somewhat exaggerated in the statistics shown here by a tendency toward less complete reporting of contraceptive practices by groups with inferior social status; but the effect of any such tendency, if appreciable at all, is presumably of very minor importance. The results indicate clearly that contraception is used much more extensively at the upper economic levels in American urban society than among groups that are more handicapped economically and socially.

The proportion who reported that they have practiced contraception intermittently or irregularly because of dislike or neglect is about the same for poor and for well-to-do white families (8 to 10 per cent for women who have experienced more than one pregnancy), but the corresponding proportion is slightly lower for the middle class group in "moderate circumstances" (6 per cent). However, the proportion of those in moderate circumstances who state that no contraception has ever been practiced is twice as high as the proportion of well-to-do wives who make such a report. The proportion of well-to-do wives who have used contraceptive methods before their first pregnancy is surprisingly high (67 per cent). In fact, initial conception must be "accidental" in some 30 per cent of all well-to-do urban white families, as this proportion of the wives in this group who have experienced one pregnancy only report "regular and steady practice of contraception." The use of birth control intermittently for the purpose of spacing children is noted for less than 3 per cent of the "very poor" Negro women and for only 15 per cent of the "very poor" white women in this series, but this description fits 55 per cent of the reports received from well-to-do women who have been pregnant more than once.

It is probable that differences in contraceptive methods are as important as differences in the frequency of attempts at contraception, in effect on variations in fertility among social classes. A suggestion to this effect is given in the Lynds' study of "Middletown":

> "All of the twenty-seven women of the business class who gave information on this point used or believed in the use of some method of birth control and took it for granted. Only one woman spoke of being uncertain as to whether she had been wise in limiting her family as she had. Of the seventy-seven wives of workers from whom information was secured on this subject, only thirty-four said that they used any means of birth control; of these twelve were 'careful,' two used primitive practices, only twenty used artificial means that might be considered moderately scientific, and only half of these last employed means of the sort utilized by the business class" (p. 123).

More extensive and specific data on this subject are supplied in Pearl's report and in a study of families living in the Borough of the Bronx, New York City, by Stix and Notestein. The sample used in the latter study is composed of birth control clinic patients, but the figures with which we are now concerned refer entirely to their experiences prior to their visit to the clinic. More than half of the women in this series are foreign-born, and two-thirds of them are Jewish. Economically this group is apparently quite comparable to the white women in Pearl's series; but the preponderance of persons with Jewish background and the basis of selection (attendance at a birth control clinic) would lead us to expect somewhat more strenuous and effective efforts toward contraception. The douche, plain or medicated, which is perhaps the simplest but least effective of the popular methods of contraception, makes up 62 per cent of the methods reported for Negro families in Pearl's series, 40 per cent of the methods reported for white families in Pearl's series, but only 23 per cent of the total usage in the data collected by Stix. On the other hand, methods demanding more control by the husband, the condom and coitus interruptus, together make up only 27 per cent of the methods reported for the Negro families, 46 per cent of the methods reported for white families in Pearl's series, but 66 per cent of the methods reported in Stix's series. Such differences, however, are not equally well marked in comparisons between different economic groups in Pearl's series, except that among the well-to-do a greater reliance is placed on the condom, and among the poor there is greater reliance on the medicated douche. Medicated vaginal suppositories or jellies make up about the same proportion (about 7 per cent) in all four economic groups in Pearl's series. About 3 per cent of the "very poor," the "poor," and those in "moderate circumstances" but only 1 per cent of the "well-to-do" in Pearl's series report reliance on "safe period." All other methods together make up from 3 to 4 per cent of the total usage of the less favored groups, and 5.3 per cent of the total usage of the "well-to-do and rich" (*see* Pearl, 1934, p. 386). The method recommended at most birth control clinics, requiring individual examination and instruction by a physician, appears in only a small fraction of the cases in any of these series.

It is possible to compare the frequency of conception in various groups, using pregnancy rates, per hundred computed ovulations, as estimated by Pearl, on the assumption that ovulation occurs once in each menstruation cycle, and that the average length of this cycle is the same in all large groups.[18] In the case of women who have been pregnant once only and confined, the mean pregnancy rate per 100 computed ovulations is 23.26±0.52 for the white women and 25.31±1.34 for the Negro women, in the case of women who have not used contraceptives. In other words, when no contraceptives are used, the interval between marriage and initial conception averages about four menstruation periods. The corresponding pregnancy rate is distinctly lower for all groups reporting use of contraceptives (limiting the analysis here to wives who have been pregnant once only), with a minimum rate of 6 pregnancies per hundred computed ovulations for "well-to-do" women practicing contraception for a time and then stopping this practice in order to effect pregnancy. In other words, the average interval between marriage and initial pregnancy in this group comprises about 16 menstruation cycles. Among women practicing contraception who have been pregnant only once, rates as high as 12.5 or more pregnancies per hundred computed ovulations (half as high as, or higher than, the corresponding rates for women not reporting contraception) appear only in the case of "very poor" and "poor" white families and "poor" Negro families who report "regular contraception," and in the case of "very poor" and "poor" Negro families using contraception intermittently because of dislike or neglect—but of course we have no record of those who never became pregnant. It should also be noted that among the more prosperous families pregnancy rates are also higher for those reporting "accidental" conceptions in spite of "regular contraception" than for those reporting "intermittent contraception mainly for planned children." The data on pregnancy rates for those who have been pregnant more than once have, in general, similar import. These findings show very clearly that (1) contraception as now practiced by American urban families is very imperfect in its operation, but (2) use of contraceptives has a powerful effect in reducing frequency of conception, (3) the efficacy of attempted contraception varies greatly among different groups, and (4) the contraceptive practices of families in "moderate circumstances" and of "well-to-do and rich" families are, in general, more efficacious than the practices usually adopted at present by "poor" and "very poor" families.

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[18] These assumptions, although recognized by Pearl as not absolutely valid, probably do not affect the significance of the comparative results. The application of this technique, without standardization, to groups with different age composition and birth-order experience involves more serious difficulties.

The most exact index of the efficacy of contraception as actually practiced in any large group is supplied in the report by Stix and Notestein on the experience of the sample already described during the years before their attendance at the birth control clinic. In this report frequency of conception is calculated per person per year of exposure to pregnancy (periods of married life with deductions for periods of pregnancy) separately for periods during which contraception was practiced and for periods during which contraception was not practiced, with standardization for order-of-birth and duration-of-marriage. They find in this series a total of 1,114 pregnancies that occurred during periods when contraception was actually being practiced. On the basis of the experience of the women in this series during times when no contraceptives were used, they estimate that if no attempts to prevent conception had been made 4,226 pregnancies would have been expected during periods equal to those when contraception was practiced. It appears that in this series the use of contraceptives eliminated nearly three-fourths of the pregnancies that would otherwise have occurred. In other words, in this series contracepton as practiced (prior to attendance at a birth control clinic) had an efficacy of about 75 per cent. In a later report these authors will deal with the efficacy of contraception in this series after attendance at the clinic. To some extent the sample represented in this study may be weighted with persons who have failed or for other reasons have become especially dissatisfied with current contraceptive practices; their neighbors who felt perfect confidence in these practices presumably did not seek further contraceptive advice. On the other hand, we have already noted that the methods used by this group were such as to give a higher expectation of efficacy than the methods used by many groups or even in the general urban population.

There is little direct information on distribution of birth control information or attitudes toward family limitation in rural communities. The only specific information on this subject would seem to indicate that the majority of farmers in agricultural areas in the West are at least tolerant of the idea of artificial limitation of births. A total of 13,341 "ballots" were collected in 1930 from subscribers to *The Country Home*, in a "Forum & Agin 'Em National Referendum on Public and Private Questions." The conservative cast of the respondents is shown by the fact that 78 per cent of them favored the existing federal prohibition laws and believed that they should be enforced, and 72 per cent believed that farm papers should not print advertisements that encourage the use of cigarettes. Nevertheless, on the proposition, "I believe that doctors should be permitted legally to impart knowledge of birth-control methods to married couples who apply jointly for such information. (By 'birth control' is meant not abstinence from normal marital relations, but the employment of artificial preventives by which the conception of children is limited to the number desired)," 67 per cent voted affirmatively, and only 33 per cent negatively (*see* Lord, 1933).

The problem of the influence of low intelligence or emotional instability on the effective use of different kinds of contraceptives is greatly in need of extensive, critical investigation. The evidence now available on this topic does seem to indicate that the problem is a serious one.

Lella S. Florence, 1930, in *Birth Control on Trial*, presented a very pessimistic account of failures to follow instructions found among the first 300 clients of the Cambridge Birth Control Clinic—an English clinic, which has good medical standing and makes recommendations similar to those usually given by the best clinics in England and the United States. Somewhat better results are reported in a later study in the same section by Ramsey. It may be noted that the patients in this series were not influenced by the urgency of medical indications required as a basis for instruction at many American clinics; and the women who did not return voluntarily to the clinic were visited in their own homes—the latter condition being a *sine qua non* of reliable studies of the operation of birth control clinics. If the term "Success" be applied to cases where instructions were followed to the time of the interview (6 months to 3 years later) without pregnancy, and the term "Failure, neglect or method abandoned" be applied to all other cases except those in which instructions were abandoned because prevention of pregnancy was no longer desired, the findings of these two studies on the efficacy of clinic instruction in the same poor London neighborhood may be summarized as follows:[19]

	Mrs. Florence's Series Per cent	Mrs. Ramsey's Series Per cent
"Success"	37.2	61.2
"Failure, neglect or method abandoned"	54.8	34.2
"Method abandoned as no longer needed"	8.0	4.6

Some of Mrs. Florence's opinions are quoted below. They are useful in affording an imaginative insight into the difficulties often encountered in the introduction of contraceptive methods.

> "We feel that the present investigation offers fairly convincing evidence that such contraceptives as can now be recommended are neither simple nor certain enough to meet the needs of a very large body of women whom it is most desirable to restrain from propagating; and that even when they are being employed by intelligent men and women they present so many disadvantages and drawbacks as to act as impediment to the full realization of the pleasures and benefits inherent in the sexual act" (pp. 12–13).
>
> "Some of the reasons given by patients for abandoning . . . [instructions] are simply frivolous or stupid. . . . Several . . . simply 'didn't trouble' [to follow instructions]" (p. 62).
>
> "One of the greatest difficulties—and one which seems unsurmountable—is the question of douching [recommended as an important accessory method]. . . . The vast majority of our patients have no bathroom or any suitable sanitary facilities for douching. The woman has no place where she can go in privacy and be alone, much less where she can prepare and administer a douche . . ." (p. 65).
>
> "A majority of our patients have suffered injury from previous child-bearing and lack of proper ante- and post-natal care. This condition is, in fact, so prevalent as to be a scandalous reflection on the casual and indifferent attitude that has hitherto been maintained—and is still maintained in many circles—toward this important subject of childbirth. Here again is a vicious circle. For the more seriously damaged the woman, the greater necessity to protect her from further injury likely to result from additional pregnancies, and the greater the difficulty in applying the contraceptive . . ." (p. 114).
>
> "Many of our failures occurred amongst women who, though we *thought* they understood the technique perfectly when they left the clinic, were nevertheless too frightened and too little confident of success to apply the method after they got home . . ." (p. 26).
>
> "Many women fail, not because they *have* used the appliance, but because they *cannot* consistently persist in its use—they are too weary and too harassed, they lack the leisure, the sanitary facilities, the privacy, and in many cases, the stamina and intelligence necessary to success" (p. 32).

Taussig, in the article on "Abortion in Relation to Fetal and Maternal Welfare" in the reports of the White House Conference on Child Health and Protection, estimates "a minimum ratio of one abortion to 2½ confinements in the cities, and a ratio of one abortion to 5 confinements in the country districts," in the United States at the end of the decade 1920–1930 (p. 449). He further estimates that spontaneous and therapeutic abortions combined may make up nearly half of all abortions in the nation as a whole, but probably not more than 20 per cent or 25 per cent of all abortions in the large cities. For some European cities, notably in Germany and in Russia, the number of abortions has been reliably estimated as comparable to the number of confinements. In Russia where abortion has been legalized, economic reasons are reported by 66 per cent of those seeking abortions in towns, and by 58 per cent of those seeking abortions in country districts; other reasons assigned are "illness" (19 per cent in towns, 30 per cent in country), "desire to conceal pregnancy" (2 per cent in towns, 7 per cent in country), and "infant at breast" (13 per cent in towns, 5 per cent in country) (Taussig, p. 460). Taussig also estimates that in the United States at present the death rate for abortions is seven times that for confinements, although the death rate for legalized abortions in Russia is far below the death rate for normal confinements. All available data clearly indicate that induced abortion is an important factor in the rural-urban differential in fertility in the United States and in most European countries. It is more difficult to define accurately the relation of abortion to the differential among urban social classes. It is possible that the relative availability of abortion in Germany and Sweden may be a factor in the disappearance or reversal of the usual social class differential in some German and Swedish cities; but this has not been demonstrated. The subject deserves more careful investigation.

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[19] The percentages given here are based on data reported by the International Medical Group, 1931, p. 37.

Sterilization has, as yet, been chiefly applied under legal authority or institutional pressure to handicapped individuals. An increase in the voluntary use of sterilization techniques may be expected with the gradual spread of information about such procedures—i.e., with recognition that salpingectomy of females, although a serious operation, is apparently not more likely to have fatal consequences than pregnancy, and that vasectomy of males is a relatively simple operation, and with the recognition that neither operation in any way interferes with the hedonistic values of sexual experience.[20] Some experimental adventures in the introduction of sterilization on a voluntary basis by some social agencies and by one enterprising individual in an industrial village in Canada have been called to the attention of the present writers. Informal reports have indicated considerable success in these adventures, but no exact data are available.

5. *Conclusions*

Physiological sterility and limited fecundity play an important rôle in diminishing the reproductive rates of some groups under present conditions, especially in the case of social groups characterized by high frequency of late marriages. Special data (the Davis series) reviewed above indicate that between two-thirds and three-fourths of all childlessness among families of superior social status in the previous generation may be attributable to this cause; and a large proportion of the instances of families limited in fertility to only one or two children must also be attributed to this cause. Much of this reproductive loss due to sterility may be preventable.

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[20] For more detailed information about sterilization procedures in the United States, *see* studies on institutional and private practice in California by Popenoe, Dickinson, and others.

Comparison with specific fertility rates at different marital ages of wives for English couples married shortly after the middle of the last century, however, indicates that there has been little or no biological change in the reproductive capacity of Anglo-Saxon peoples during the last fifty years, although birth rates have been falling rapidly during this period. This conspicuous decline in fertility must, therefore, be attributed to social causes affecting voluntarv limitation.

Ages of spouses at marriage, and especially the age of the wife at marriage has an important influence on *fecundity*, which is associated with a tendency toward more strenuous *voluntary* limitation of fertility on the part of couples marrying at advanced ages.

The frequency of childless and one-child families in groups with superior education is due in large part to involuntary sterility and other influences associated with late marriage; but the scarcity of very large families in this group is due chiefly to voluntary limitation.

There appear to be significant differences in the availability to different social classes of accurate contraceptive information; and such differences affect the relative efficacy of contraceptive practices in different social groups. In part, however, the high fertility of handicapped groups may be due to difficulties inherent in the effective use of the most reliable contraceptive methods now available.

Abortion, which demands no persistent self-discipline, but which is repudiated by most medical authorities, may be employed most frequently by groups with inferior social status, but our information on this subject is very uncertain. Induced abortions are much more frequent in urban than in rural communities.

Sterilization, especially vasectomy of males, which is free from some of the most serious objections against abortion, and which makes no demands on the individual except initial consent and expense, has as yet had only a limited use. Voluntary sterilization, apart from legal or institutional pressure, has been confined largely to a few persons of superior social status.

Up to this point we have considered merely physiological conditions and medical practices affecting size of family. Attention must now be given to the variety of social influences and personal motives which influence fertility.

CHAPTER XII

ECONOMIC AND SOCIAL FACTORS AFFECTING FERTILITY

1. *Relation of Size of Family to Birth Rates*

Considerable insight can be gained into the nature of the recent general decline in the birth rate through an analysis of the distribution of sizes of families in large populations with quite different birth rates. For example, we may compare size-of-family tendencies in North Carolina, Indiana, and California, applying Burks' method to the birth-order data for infants born to native white mothers in 1928.[1] These three states are selected because we have found that during the years 1925–1930 the fertility among native white women in Indiana was just about sufficient to supply population replacement, whereas that of the native white women of North Carolina was more than 40 per cent above the estimated replacement quota, but that of the native white women of California was more than 30 per cent below the same replacement quota at the same time. We may now observe that these wide variations in fertility are powerfully affected by differences in the frequency of families with six children or more. About one-fourth of the mothers in North Carolina, about one-sixth of those in Indiana, but only about one-sixteenth of those in California bear six children or more in the course of their lives (*see* Table 99). If the mothers with such large families all bore, on the average, just three children apiece, while all the other mothers continued to reproduce as in the past, the average numbers of children per mother in each state would be changed to 2.55 for North Carolina, 2.50 for Indiana, and 2.27 for California—whereas according to our estimates on the basis of actual birth-order data, these averages run: 3.86 for North Carolina, 3.37 for Indiana, and 2.45 for California. These values are compared with the replacement requirements in Table 99.

We have already noted that less than 2 per cent of the wives aged 40 or over in the Davis series, women of superior social status, are reported as having borne six or more children—but some allowance should be made in this case for the omission of children born alive but dying in infancy and neglected in reporting "number of children." A comparison of the curve representing sizes of families for this series with that for earlier English

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[1] It should be noted that this procedure has no reference to the frequency of childless marriages; it simply shows the expected distribution of completed maternity-frequencies for all women who have become mothers during any specified period. Since the procedure is based on reports regarding numbers of children ever-born, the results reflect past conditions, and are disturbed by changes in fertility during the period to which the reports refer. Birth rates among native whites in the three states listed above have been falling fairly rapidly during the last twenty years, so that the estimated proportions of fraternities of different sizes reflect somewhat higher fertility rates than are characteristic of these populations at present.

TABLE 99

Expected Distribution of Sizes of Completed Fraternities and Average Size of Completed Fraternities, Estimated on Basis of Birth-Order Data for Native White Mothers in North Carolina, Indiana, and California, 1928

Children Born Alive per Mother, Completed Fraternities	Per Cent of Fraternities Expected in Each Class		
	North Carolina	*Indiana*	*California*
1	26.1	24.4	34.5
2	18.7	23.8	31.0
3	13.5	16.6	15.7
4	9.3	10.4	8.8
5	8.1	8.1	3.9
6 or more	24.3	16.7	6.2
	100.0	100.0	100.1

Reference	Average Number of Children		
	North Carolina	*Indiana*	*California*
Per mother	3.86	3.37	2.45
Per mother of 6 or more children	8.4	8.0	7.6
Per mother, on the *hypothesis* that fraternities of three children were substituted for all fraternities of 6 or more children	2.55	2.50	2.27

Needed for replacement:	
Per fertile couple, if 9 per cent of all couples remain childless [a]	
(a) at death rates for United States whites, 1919–1920	3.30
(b) at New Zealand death rates, 1925–1928	2.98

[a] *See* Table 101, below.

couples of all classes clearly indicates that great differences in general birth rates are in large part a function of the disappearance of very large families.[2]

According to data reported by Notestein, the frequency of families with six children or more per mother decreased more than 50 per cent in urban business and professional groups, and nearly 50 per cent among skilled workers during a single twenty-year period—comparing numbers of children ever-borne by wives aged 40–44 years, with numbers of children ever-borne by wives twenty years older, as reported in 1910.

The conspicuous elasticity of birth rates under modern conditions is in large part a function of varying frequencies of very large families. It is here that the introduction of effective contraceptive methods and the pressure of modern economic and social forces have operated with such startling results. And it seems extremely unlikely that any group which has once adopted extensive family limitation practices will again be characterized by a high frequency of very large families, except among persons enjoying unusual economic security, or motivated by unusual interest in children or other special considerations. Birth rates may, therefore, be

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[2] *See* Figure 50, above.

TABLE 100

PERCENTAGE OF WIVES AGED 40–44 AND 60–64 IN CERTAIN SOCIAL CLASSES WHO HAD BORNE SIX CHILDREN OR MORE. MILBANK SAMPLE OF UNITED STATES CENSUS SCHEDULES, NATIVE WHITES OF NATIVE PARENTAGE, 1910.*

Number of Wives in Sample		Classification According to Occupation of Husband	Per Cent Who Had Borne 6 or More Children	
Aged 60–64	*Aged 40–44*		*Wives Aged 60–64*	*Wives Aged 40–44*
354	1,296	Professional	14.1	4.2
762	3,043	Business	15.6	6.0
444	1,902	Skilled	23.6	13.0
137	423	Unskilled	30.9	21.5
1,709	3,488	Farm owner	30.5	23.5

* From Notestein, 1931. *See* above, Chapter IV, Table 34.

expected to fluctuate within narrower limits in the future than in the past, and within these limits they are subject to a great variety of influences.

This brings us to the statement of a proposition of great social and eugenic importance, which must be given serious consideration: *In a population with a high standard of living which has acquired techniques of family limitation, reproduction at the replacement level can be expected only when social conditions are distinctly favorable to fertility.*

The chart on the opposite page (Figure 51) is introduced to represent the sort of distribution of families by numbers of children that, in the judgment of the present writers, is the kind of distribution most likely to be found in a modern population with high standards of living and with knowledge of contraceptive techniques if fertility were maintained at a level sufficiently high to supply population replacement. This hypothetical distribution of sizes of families in a self-replacing population is compared

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FIG. 51. HYPOTHETICAL DISTRIBUTION OF ALL SURVIVING COUPLES BY NUMBERS OF CHILDREN BORN ALIVE TO EACH COUPLE IN A SELF-REPLACING POPULATION, AT SPECIFIED CONDITIONS FOR A GROUP WITH SUPERIOR SOCIAL STATUS—COMPARED WITH ACTUAL DISTRIBUTION IN DAVIS SAMPLE OF 308 AMERICAN WIVES.[a]

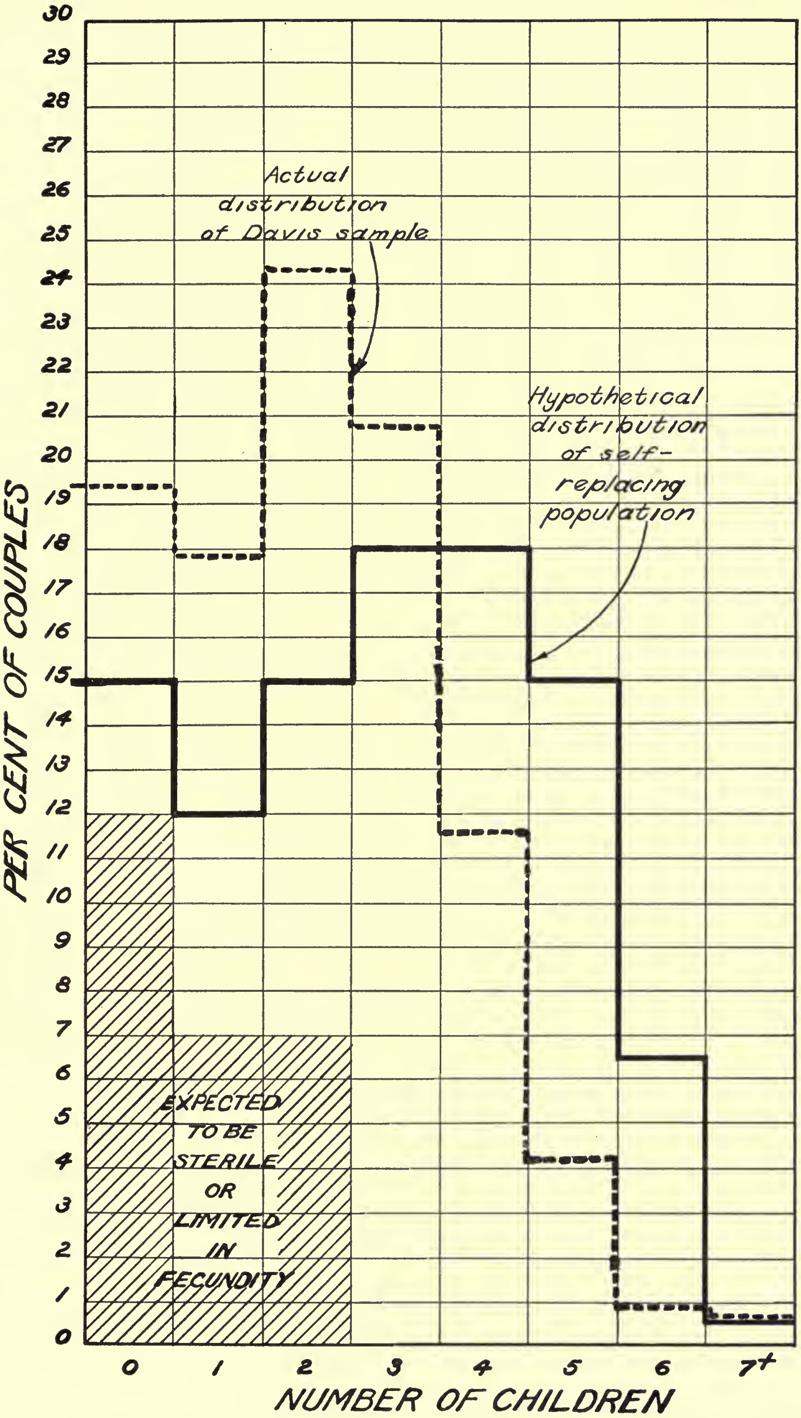
Hypothesis: Death rates as in New Zealand, 1925–1928; 85 per cent of women married before end of childbearing period; 95 per cent of childbearing period, after first marriage, passed in married state; 12 per cent of couples sterile, 7 per cent limited in fecundity to one child, 7 per cent limited in fecundity to two children, on basis of English marriages, 1861–1871, and Davis sample; 3 per cent of fecund couples childless, and 5 per cent of fecund couples with one child only (*see* text); only one-half of one per cent of couples bear seven or more children, averaging eight children.

Replacement quotas:[b]

Children per woman	2.31
Children per couple	2.86
Children per couple not limited in fecundity to 0–2 children	3.58
Children per fertile couple, not limited in fecundity to 1–2 children, and exclusive of 3 per cent assumed to be voluntarily childless, and 5 per cent assumed to be voluntarily limited to one child	3.94

[a] The actual distribution of numbers of children in the Davis sample, as reported, and as here represented, would supply about 72 per cent of the corresponding replacement quota. If allowance is made for absence from the record of children dying in infancy, the force of fertility in this group may have been equal to about 80 per cent of this replacement quota (*see* previous chapter).

[b] Quotas for surviving persons or couples, assuming corresponding fertility rates at specific ages for incomplete marriages, interrupted by death or divorce.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PER CENT OF COUPLES
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2
3
4
5
6
7+
NUMBER OF CHILDREN
Actual distribution of Davis sample
Hypothetical distribution of self-replacing population
EXPECTED TO BE STERILE OR LIMITED IN FECUNDITY

with the corresponding actual distribution found in the Davis series of American wives, mostly college graduates.

Various "individual and family replacement values" are shown in Table 101. The data and formulae on which these values are based are given in Appendix W.

TABLE 101

INDIVIDUAL AND FAMILY REPLACEMENT QUOTAS *

Reference	At Age- and Sex-Specific Death Rates, and at Sex Ratios at Birth of the Following [a]		
	United States Whites 1919–1920	*Negroes in 7 Southern States 1919–1920*	*New Zealand 1925–1928*
A. Per woman living to fertility-survival center	2.51	2.85	2.29
B. Per ever-married woman (Acc. to Lotka) [b]	2.62		
C. Per woman of completed fertility	2.55	2.99	2.31
D. Per ever-married woman of completed fertility [c]	2.83	3.32	2.56
E. Per surviving couple [d]	3.00	3.52	2.71
F. Per fertile surviving couple, if 9 per cent of couples are childless	3.30	3.87	2.98
G. Per fertile surviving couple, if 20 per cent of couples are childless	3.75	4.40	3.39

* Data and formulae given in Appendix W.

[a] But with marital conditions held constant for all groups, on basis of conditions as stated for quotas D, E, F, and G.

[b] Lotka, 1925, "The Measure of Net Fertility," *Journal of Washington Academy of Sciences,* Vol. 15, pp. 469–472.

[c] Marital births only (according to proportion of marital births in total white births, 1928–1929, and marital proportions for native white women aged 40–45 years, 1930).

[d] The same, but with added adjustment for average number of years lived as widowed or divorced, by ever-married native white women during childbearing period.

2. *Reasons for Limitation of Family Reported by American Wives of Superior Social Status*

We have already found (*see* Chapter X) that many, perhaps more than half, of the childless couples in marriages of completed fertility in the Davis series, and a considerable proportion of the couples with only one or two children, were unable to bear children (or unable to have more children) because of physiolgical sterility or limited capacity to bear children alive. A summary of the reasons for contraceptive practices, as stated by the wife, is given here for all couples with less than four children in this series who did report some sort of birth control efforts.[3] (*See* Table 102.) It is immediately apparent that the motives indicated are extremely complex. The situations leading to family limitation are represented as fairly urgent in a large proportion of the cases.

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[3] A small number who reported reliance on "safe periods" are not included in this list, in view of the fact that the most popular "safe period" at the time represented by these reports included that portion of the menstruation cycle which is now considered by competent authorities to be a period of maximum fertility.

The reasons for use of contraceptives indicated in this table may be grouped as follows. In the case of 21 *childless* wives who had used contraceptives, seven had intended only delay; eight were motivated by considerations of personal health, fear of bearing unhealthy offspring, or complications of family situation; the other six report a variety of social, economic, and psychological motives. The last group of motives are mentioned by only 10 per cent of the childless wives in this sample. In the case of 33 wives who had borne only *one child* and report use of contraceptives, health and economic reasons appear about equally balanced, and these two considerations outweigh all others, appearing in about two-thirds of all cases. Among 109 wives who had voluntarily limited their families to *two or three children* (combining two classes that show similar distributions of reasons), about one-third give no reason, or simply say that they wanted no more children. These cases, combined with those reporting economic motives constitute about one-half of this combined group. Health considerations and temporary use of contraceptives for spacing, combined, cover most of the other cases.

TABLE 102

Distribution of Reasons Stated for Contraceptive Practices Reported by 163 Wives, Aged 40 Years or Over, with Less than Four Children, Davis Series. (Each of Two Principal Reasons, if More than One is Stated, Entered in Parenthesis).

Number of Children Ever-Born	Number of Wives in Each Class	Temporary Circumstances [a]	Health (Including Fear of Child Bearing) [b]	Economic Reasons [c]	Children (More Children) "Not Wanted"	Professional Interests of Women [d]	Fear of Producing Unhealthy or Defective Offspring	Complications of Family Situation [e]	Aversion to Inconvenience of Pregnancy	Pessimism or Similar Motive	No Answer
0	21	7	2(2)	1	1	2	2	2(2)	(1)	1(1)	—
1	33	3	8(5)	9(5)	1(2)	2	1	1(2)	(1)	(1)	—
2	58	6	22(2)	7(1)	15(1)	—	—	2	—	—	4
3	51	4	16(4)	8(4)	16	1	—	—	—	—	3
Total	163	20	48(13)	25(10)	33(3)	5	3	5(4)	(2)	1(2)	7

[a] Limitation for a brief period intended, frequently first one or two years after marriage, or during a convalescence. With specification "economic": 9 cases. With comment, "Later wanted to have (more) children": 8 cases.

[b] Including "To prevent children coming too closely," and limitation motivated by difficulties in previous confinements.

[c] Including unsettled residence, 2 cases.

[d] This group comprises 2 physicians, 2 teachers, 1 foreign missionary.

[e] Including marital discord, presence of step-children, other relatives in home, and so forth.

Statements of reasons for actions must, of course, always be received with caution. There is every reason to believe in this case, however, that the reports represent true statements of the motives which these women consciously recognized in themselves; but these conscious motives may have involved rationalizations in some cases. It is extremely important to recognize the complexity of reasons for severe family limitation. Roughly speaking, we may say that absolute sterility, temporary use of contraceptives to delay childbearing, and a variety of fairly compelling circumstances seem to account for a large proportion of the childless marriages which appear among families of superior education. Such factors also bulk large in the case of families limited to one child only. In the case of families voluntarily limited to two or three children, economic and social motives appear to play a larger rôle. After three or four children have been borne, contraceptive practices seem to be taken for granted by most of the women in this series, the large majority of whom are college graduates.

3. *Health Considerations*

More than one-fourth of all the wives with less than four children in the Davis series listed health considerations as a primary reason for contraceptive practices. Anxiety regarding health was especially emphasized in this series in the case of women marrying at an advanced age. Birth control clinic data, usually representing chiefly women of average or inferior social status, also show high proportions of women who allege health considerations as primary reason for wanting contraceptive information. But these data cannot, of course, be accepted at their face value, even in the case of clinics which give contraceptive advice on economic grounds, because concern for health is a very plausible reason, that cannot easily be criticized.

TABLE 103

BIRTHS PER YEAR PER 1,000 WOMEN AT SPECIFIED AGES IN TOTAL POPULATION OF SWEDEN, 1871–1880, AND 1921–1922 *

Age Classes	Confinements per 1,000 Women		Ratio of Age-Specific Rates in 1921–1922 to Corresponding Rates in 1871–1880 (B/A)
	1871–1880 (A)	*1921–1922* (B)	
15–20	9.6	19.3	2.01
20–25	106.4	105.7	.99
25–30	208.5	142.7	.68
30–35	233.3	129.4	.55
35–40	203.9	102.3	.50
40–45	119.4	52.6	.44
45–50	18.6	6.7	.36

* Adapted from Kuczynski, 1928, *The Balance of Births and Deaths; I, Western and Northern Europe*, p. 138.

This leads us to examine the question, "To what extent has voluntary family limitation contributed to health improvement?" This question cannot be answered categorically. But data are available that bear on the problem, at least indirectly. We have already seen (Chapter XI) that the frequency of childless marriages increased much more rapidly in England during the last half of the Nineteenth Century in the case of women marrying at advanced ages than in the case of women marrying at early ages. Comparable data for Sweden for the years 1871–1880 and 1921–1922 are shown in Table 103.[4]

A variety of factors must influence this trend to reduce children in late marriages, but the reluctance of women marrying at advanced ages to assume risks of maternity is undoubtedly one important influence. The relation of age at confinement to risk of death in pregnancy is shown in the following table.

TABLE 104

Maternal Mortality Rates, by Age of Mother; United States Birth Registration Area, 1921 *

Age of Mother	Deaths per 1,000 Live Births		
	All Puerperal Deaths per 1,000 Live Births	*Deaths Due to Puerperal Septicemia per 1,000 Live Births*	*All Other Puerperal Deaths per 1,000 Live Births*
Total	6.8	2.7	4.1
Under 15	20.0	5.4	14.6
15–19	6.8	2.7	4.0
20–24	5.0	2.2	2.8
25–29	5.6	2.4	3.2
30–34	7.4	2.9	4.5
35–39	10.3	3.6	6.7
40–44	13.1	4.3	8.8
45 and over	19.2	6.5	12.8

* From Woodbury, 1926, *Maternal Mortality*, p. 33.

The ages 20–24 years appear as the most favorable time for childbearing according to this table. The risk gradually increases with age, but not so rapidly as is often supposed by laymen. Thus, the risk at ages 40–44(.013 maternal deaths per birth) is less than three times the risk at ages 20–24 (.005 maternal deaths per birth). It must also be remembered that the relative frequency of births at advanced ages varies somewhat in different social classes. The same writer reports a comprehensive study of the relation of order of birth to maternal mortality, using Coghlan's data for New South Wales.

It appears that, after the first birth, there is a consistent tendency for risk to increase at successive births. But, again, the increase is not so great as is often supposed by laymen. In fact, the risk at the sixth, seventh, and eighth confinements still appears to be slightly less than the risk at the first confinement.

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[4] There were, on the average, in Sweden, 30.5 births per 1,000 population during the earlier period, and 20.1 births per year per 1,000 population during the later period, 1921–1922. The annual birth rate in Sweden first began to show consistent decrease in 1880 and following years. This decrease has continued through the entire third decade of the Twentieth Century, to a value of 15.9 births per 1,000 population in 1930.

TABLE 105

MATERNAL MORTALITY RATES, BY ORDER OF BIRTH; BIRTHS TO MARRIED WOMEN, NEW SOUTH WALES, 1893–1898 *

Order of Birth	Births	Deaths in Childbirth	Maternal Mortality Rate	
			Actual Experience	*Adjusted Figures*
First	41,385	365	8.82	8.80
Second	34,089	150	4.40	4.70
Third	29,334	150	5.11	5.09
Fourth	24,675	130	5.27	5.54
Fifth	20,621	136	6.60	6.10
Sixth	16,788	104	6.19	6.82
Seventh	13,479	99	7.34	7.54
Eighth	10,328	90	8.71	8.72
Ninth	7,510	79	10.52	9.92
Tenth	5,213	47	9.02	10.40
Eleventh	3,420	31	9.06	11.00
Twelfth	1,983	28	14.12	12.46
Thirteenth	1,071	15	14.01	14.50
Fourteenth and over	1,039	8	7.70	—[a]

* From Woodbury, 1926, *Maternal Mortality*, p. 35 (Data from Coghlan).

[a] Not computed.

The best evidence on the effect of reduced fertility on the health of women can probably be obtained by comparing variations in age-specific death rates for females during the childbearing period with variations in other specific death rates. Maternal mortality statistics are subject to serious irregularities. Moreover, the indirect effects of unregulated pregnancies and confinements on the health of women would not, in any case, appear in maternal mortality statistics. Variations in death rates do not, of course, tell the whole story of variations in physical well-being. It is, however, generally assumed that any impairments to health lower resistance to disease, and so tend to be reflected in heightened death rates.

We do find evidence of the influence of excessive fertility and inadequate maternity care on specific death rates for females of childbearing age in populations characterized by unlimited fertility. This is illustrated, for example, by comparing specific death rates in Quebec (where fertility is very high) with specific death rates in the rest of the Dominion (*see* Table 106).

Curves representing secular trends in specific death rates from 1900 to 1929 for the United States registration area as of 1900 show some relative decline in specific death rates for females, as compared with males, in the pre-puberty, late childbearing, and subsequent periods (*see* Sydenstricker, 1933 and 1933a). Unfortunately, however, the registration area of 1900 includes only the five New England states, and New York, New Jersey, Indiana, and Michigan; and the decline in birth rates in this area during the period in question has been very largely concentrated in the foreign-born elements in these states. A more pronounced relative decline in death

TABLE 106

Mortality Rate per 1,000 Persons at Specified Ages, by Sex, in Canada, Excluding Quebec, and in Quebec, 1929–1931 *

Ages	Canada Excluding Quebec		Quebec	
	Males	*Females*	*Males*	*Females*
0	78.66	62.65	123.26	97.33
1	10.61	9.36	21.24	18.55
5	2.66	2.36	3.93	4.30
10	1.56	1.33	1.79	1.86
15	2.12	1.85	2.53	2.70
20	3.07	2.77	3.75	4.10
25	3.46	3.42	4.03	*5.01* [a]
30	3.52	3.68	3.91	*5.52* [a]
35	3.92	4.21	4.62	*5.99* [a]
40	4.89	4.89	6.09	*6.90* [a]
45	6.44	5.92	7.83	7.86
50	8.96	7.80	10.62	9.47
55	12.93	11.19	14.46	12.94
60	19.17	16.58	21.15	20.20
65	30.05	25.69	33.02	30.84
70	46.16	39.90	50.57	47.55

* Abstracted from *Statistical Bulletin, Metropolitan Life Insurance Company*, 1933, Vol. 14, No. 11, p. 2.

[a] Rates for females are in italics in cases where these rates are more than 12 per cent above corresponding rates for males.

rates for females aged 30–39 years and 40–44 years may be observed in comparable data for Massachusetts, during the period 1890–1915, also presented by Sydenstricker. These changes, however, may be interpreted as due in part at least to the better adaptation of foreign-born women to American standards and improvements in obstetrical procedure rather than merely to the influence of more extensive family limitation.

Because of the paucity and ambiguity of the American data on this topic, the present writers have examined Swedish data, where more accurate vital statistics are available for the analysis of secular trends. Comparing data for the periods 1871–1880 and 1921–1925 we find that, in spite of a decrease of 32 per cent in fertility rates for women aged 25–30 years, and a decrease of some 50 per cent in fertility rates for women aged 30–45 years, death rates at these ages have not decreased as rapidly for women as for men (*see* Table 107).

The table shows that in Sweden in 1921–1925 the specific death rates for the two sexes were very nearly equal through the whole range, 15–50 years of age, although in 1871–1880 the specific rates were much higher for males than for females at these ages. The most reasonable interpretation of these results is that in Sweden the influence of improvements in industrial conditions during this period on the lives of men has been a much more important health factor than any influence of decrease in size of families or in the frequency of late pregnancies on the lives of women.

We conclude, tentatively, that unlimited fertility does involve serious

TABLE 107

A Comparison of Fertility Rates for Females at Specified Ages, and of Death Rates at Specified Ages (for Males and for Females) for the Periods 1871–1880 and 1921–1925, in Sweden

Age Classes	Items	Births, 1871–1880; [a] Deaths, 1871–1880 [b]	Births [a] 1921–1922; Deaths, 1921–1925 [b]	Later Rates Expressed as per Cent of Earlier Rates
10–15	Deaths per 1,000 women	4.22	2.00	47.4
	Deaths per 1,000 men	4.08	1.86	45.6
15–20	Births per 1,000 women	9.6	19.3	201.0
	Deaths per 1,000 women	4.44	3.36	75.7
	Deaths per 1,000 men	4.60	3.50	76.1
20–25	Births per 1,000 women	106.4	105.7	99.35
	Deaths per 1,000 women	5.42	4.24	78.2
	Deaths per 1,000 men	6.82	4.94	72.4
25–30	Births per 1,000 women	208.5	142.7	68.4
	Deaths per 1,000 women	6.54	4.22	64.5
	Deaths per 1,000 men	7.38	4.64	62.9
30–35	Births per 1,000 women	233.3	129.4	55.5
	Deaths per 1,000 women	7.16	4.42	61.7
	Deaths per 1,000 men	7.96	4.50	56.5
35–40	Births per 1,000 women	203.9	102.3	50.2
	Deaths per 1,000 women	8.06	4.82	59.8
	Deaths per 1,000 men	9.06	4.84	53.4
40–45	Births per 1,000 women	119.4	52.6	44.05
	Deaths per 1,000 women	8.86	5.62	63.4
	Deaths per 1,000 men	10.56	5.66	53.6
45–50	Births per 1,000 women	18.6	6.7	36.0
	Deaths per 1,000 women	9.72	6.78	69.7
	Deaths per 1,000 men	12.9	7.26	56.3
50–55	Deaths per 1,000 women	12.44	8.84	71.1
	Deaths per 1,000 men	16.34	9.92	60.7

[a] From Kuczynski, *The Balance of Births and Deaths; I, Western and Northern Europe*, pp. 137–138.

[b] Data for 1871–1880 from *Tables de mortalité et de survie en Suède pour les années 1916–1910*, pp. 26–28; data for 1921–1925 from *Statistisk Årsbok, 1930*, p. 56.

Specific annual death rates taken as one-fifth probable deaths during specified five-year period per 1,000 persons living beginning of period: $\frac{1}{5}\left(\frac{l_x - l_{x+5}}{l_x}\right)$

health hazards for women, but that within moderate limits degrees of fertility have little direct relation to the health of women, when groups with similar standards of living are compared. It seems important to draw a sharp distinction between specific pathological conditions which may be recognized by competent physicians as medical indications against pregnancy, and common concern about the effects of pregnancy on health based on general a priori considerations. There is, of course, always some risk to health in exposure to pregnancy. But this risk is ordinarily less than the risk of industrial employment under modern social conditions.

We may also tentatively conclude that the most favorable time, physiologically, for initial confinement is in the vicinity of twenty years of age. Early childbearing has the additional advantage, if reproduction at the replacement level or above is to be maintained, of allowing both for proper spacing of births and for moderately large families.[5] Moreover, we have already noted that delay in childbearing increases the risk of sterility. Although childbearing at advanced ages does involve increased risks to maternal health, the real danger may often be exaggerated psychologically. Therefore, psychologically as well as physiologically, reasonably early marriage and early maternity are probably essential conditions of high fertility in any group with high standards of living and familiarity with contraceptive techniques.

"Concern for wife's health," as a reason for family limitation, often involves other considerations than mere anxiety about the physiological effects of childbearing. Potential parents must also take into account the time that must be spent, the strain on health resources which might otherwise be devoted to other affairs, and the possibility of providing adequate facilities and aid to the wife in caring for children. We are thus led into the problem of the relation of fertility to standard of living and income.

4. *Standard of Living and Income*

It is apparent that many families are motivated to limit childbearing because of economic pressure. Nevertheless, a negative correlation is usually found between size of family and income. This paradox is resolved by taking variations in standards of living into account. More generalized expressions of this principle appear frequently in the literature on population problems.

The following sentences may be cited from a recent essay entitled *What is Eugenics?* by Leonard Darwin:[6]

> "What makes people limit the size of their families is really not being rich, but feeling poor. The rich man wishing to be rich feels poorer than the poor man contented with his poverty. People feel poor in every rank of society. . . . It is the feeling that they cannot live up to the standard customary in their class that tempts a couple to keep the strain of family life within bounds by having few children. . . .
>
> "Bachelors and childless couples have more money to spend as they like than have those parents with whom they most often associate. It is the childless, therefore, who take a leading part in setting the pace in unnecessary expenditure" (p. 80).

[5] Dr. Walter Timme has recommended that at least two summers elapse between the completion of one pregnancy and the initiation of another, since sunlight plays an important part in building up glandular reserves which are drawn upon in pregnancy. In some cases much longer delay may be advisable. (Conference on Birth Control and National Recovery, 1934.)

[6] These sentences are from a section on "Financial Aids to Parenthood."

Taking such considerations into account, and noting that variations in fertility largely control reproduction trends among civilized peoples, whereas among primitive peoples rates of increase are conditioned by means of sustenance and by military power, Bowen has formulated a general law of population growth, as follows:

> "Populations tend to increase, directly with wealth, and inversely with prevailing levels of living-standards" (p. 23).

Von Ungern-Sternberg, 1931, presents a vivid historical treatment of the social changes in Europe during the Nineteenth and Twentieth Centuries, in relation to birth rate variations, supported by a variety of statistical materials. He finds the origin of the declining birth rate in capitalistic enterprise and the rationalistic, "pushing" spirit of all classes in contemporary society, aggravated by increasing anxiety and repeated economic crises. A somewhat similar thesis was presented by Muller at the Third International Congress of Eugenics, New York, 1932.

Apropros of these suggestions it would be extremely interesting to learn just what is happening to differential fertility among occupational groups in Russia under the Communist régime. It is perhaps too soon to expect decisive results. In any case, the present writers have been unable to find any reliable data on this topic.

Economic crises furnish the example par excellence of rapid drops in the *level* of living of total populations, with no corresponding change in *standards*. We have noted that birth rates have declined rapidly in England and Germany where unemployment and other adverse economic conditions have been acute and prolonged. But the birth rate has dropped with equal rapidity in Sweden where economic life has been somewhat less disturbed. In the United States the average annual decline in birth rate from 1930 to 1933 has been about twice as high as the average annual decline during the preceding decade. Interestingly enough, however, urban families who have been reduced to a condition of want and families with unemployed workers have had distinctly higher birth rates during this period than families that have suffered less during the depression. Apparently, *below a certain level, an accentuation of poverty seems to cause a rise rather than a decline in fertility rates* (*see* Chapter IV, Tables 33 and 34).

All students find a fairly high positive association, when trend lines or moving averages are used, between variations in volume of business and contemporary variations in marriage rates, usually with coefficients of correlation from about .6 to about .9. Most students also find much lower but nevertheless significant positive correlations between the business indices at given dates and birth rates for periods of one, two, or three years later. The results obtained by Thomas, in the most extensive treatment of this subject, are shown in Table 108. A very interesting secular change is here indicated in the relation of the general birth rate to business conditions.

TABLE 108

Coefficients of Correlation: British Business Cycles (as Standard) with Marriage Rates, with General Birth Rates, and with Illegitimate Birth Rates, in England and Wales, 1854–1913 *

A. MARRIAGE RATE, CORRELATED WITH INDEX OF BUSINESS ACTIVITY

Periods	Years that Correlative Lags behind Standard			
	0	1	2	3
1854–1913	+.67±.07	+.45±.10		
1854–1874	+.64±.13	+.43±.18		
1875–1894	+.84±.07	+.79±.09		
1895–1913	+.57±.15	+.09±.23		

B. GENERAL BIRTH RATE, CORRELATED WITH INDEX OF BUSINESS ACTIVITY

Periods	Years that Correlative Lags behind Standard			
	0	1	2	3
1854–1913	−.07±.13	+.07±.13	+.29±.12	+.30±.12
1854–1874	+.04±.22	−.14±.21	+.09±.22	+.03±.22
1875–1894	−.17±.22	+.17±.22	+.35±.20	+.34±.20
1895–1913	−.03±.23	+.16±.23	+.42±.20	+.64±.15

C. ILLEGITIMATE BIRTH RATE, CORRELATED WITH INDEX OF BUSINESS ACTIVITY

Periods	Years that Correlative Lags behind Standard			
	0	1	2	3
1854–1913	+.07±.13	−.26±.12	−.39±.11	−.37±.12
1854–1874	+.26±.20	−.04±.22	−.37±.19	−.33±.20
1875–1894	+.10±.22	−.32±.20	−.43±.18	−.38±.19
1894–1913	−.25±.22	−.43±.19	−.39±.21	−.42±.21

* Thomas, 1925, *Social Aspects of the Business Cycle*, pp. 93, 104.

Thomas comments on the significance of the analysis thus:

> "It suggests the interesting hypothesis that, whereas as business depression formerly led to 'prudential restraint' through abstention from marriage, it now leads to a more widespread and deliberate birth control. It seems reasonble to expect that the birth-rate would respond more sensitively to the business cycle as it becomes subject more to human volition.
>
> "The direct response of the birth-rate to the business cycle offers a partial explanation of the cause of the lag in the birth-rate. The effects of unemployment and financial stresses accumulated during a depression are not immediately relieved when prosperity is indicated by the business barometer. Wages lag behind commodity prices in a business revival. It probably takes a considerable period to recover from the losses of a depression, hence there might be unwillingness to assume further responsibility by increasing the size of the family until prosperity is fairly well established. . . .

> "The response of the birth-rate to the business cycle, then, is probably partly direct, through the differential conscious control of births in prosperity and depression and partly indirect through a reflection of the fluctuations in the marriage-rate. . . . The illegitimate birth-rate does not seem to have been affected to the same extent as the birth-rate by the diffusion of birth-control information" (pp. 99–101).

It is possible that the effect of economic crises on family life and on reproduction, especially in the case of those with fairly high standards of living, may be increasingly disturbing until a more stable economic order can be established.

There is considerable evidence that within the professional and the upper commercial groups, those who enjoy unusual security and prestige have somewhat higher reproduction rates than those with inferior economic and social status. Data to this effect have been reported by Wiggam, Woods, Huntington and Whitney, Phillips, and others. This suggestion applies at present only to small groups with unusual advantages. It introduces us, however, to some interesting suggestions concerning the relation of social-economic factors to fertility. Huntington and Whitney found a high positive correlation among Yale graduates between fertility and ratings on "success in life," by committees of classmates. In the instructions to these committees, ethical and social qualities were stressed but apparently no hint was given regarding the purpose of the investigation. It is possible, therefore, that the judges took family life into account in their ratings and so tended to rate a man with "a fine family" as more "successful" than a bachelor or one who was divorced. However, this possibility of unconscious bias could not affect relationships reported by these writers between various objective criteria of success and fertility—where positive correlations again appear, although these correlations are lower. The unmarried members of the Yale classes of '93, '96, and '98 were found to have received lower average grades than the married. Among the married, those with five or more children seemed to have received slightly higher grades in college than the childless or those with only one child, but the men with three children appear to have been the most advanced scholastically, followed closely by those with two and four children. It may be, as suggested by the authors, that moderate sized families are most representative of those who pursue professional careers—whereas the unmarried and the childless include, among others, many of the men who were never successful either in college or in later life, while the largest families are found among those who were successful in later life but did not especially excel in academic studies. This inference is somewhat strengthened by a curve showing that participation in extra-curricular activities in college rises from an average of only about two such activities in the case of the men who remained unmarried to an average of about four such activities for the men who were later to have four, five, or more children (pp. 248–249). Woods found that among Harvard graduates of the classes 1890, 1892, 1894, and 1898, those listed in *Who's Who in America, 1924–1925* have higher marriage rates than those not so included, slightly less than 10 per cent of those in Who's Who being reported as unmarried. The average number of children reported per graduate (1.6) is also apparently slightly higher for this group than for all Harvard graduates of the same period. Phillips, 1927, consulting with others, subjectively classified Harvard graduates of the classes 1899–1901 into five groups according to "success." Group I comprises only men who might properly be regarded as "eminent." There is an implication that many of them were wealthy; the question as to whether or not they enjoyed wealth or superior social advantages at the start, Phillips states, was disregarded in his ratings. The bottom group includes the men whom Phillips regarded as "undesirables," "odd sticks," and so forth. One may guess that many of these were intellectual young men from poor families who may not have been altogether happy at Harvard. These implications are developed because it seems likely that Phillips' ratings of "success" may in part at least be ratings of economic and social "security." Phillips' findings are shown in Table 109.

TABLE 109

SUCCESS AND MARITAL RELATIONS OF HARVARD COLLEGE GRADUATES, 1899, 1900, AND 1901 *

	Social Ratings by Phillips					
	Class I	*Class II*	*Class III*	*Class IV*	*Class V*	*Total*
Graduates in each class	120	430	735	473	131	1,899
Number married	112	374	637	341	76	1,540
Per cent married	.93	.87	.87	.72	.58	.81
Average number of children born per married graduate	2.35	2.24	1.92	1.55	1.37	1.93
Average number of children born per graduate	2.19	1.93	1.67	1.12	.80	1.56

* Adapted from Phillips, 1927, "Success and the Birth-Rate," *Harvard Graduates' Magazine*, Vol. 35, p. 568.

Robinson, 1932, in an analysis of the records of graduates of a coeducational college, found that 81 men and 52 women on a "special contributors" list had larger families, on the average, than other alumni and alumnae of the same classes. All except two of the men on this list had married. They had an average of 2.5 children per marriage (with 15 per cent childless). Among the women on the list, 23 per cent were unmarried; but among the married we find an average of 2.7 children per family (with 12 per cent childless). Although the fertility of these families is below replacement needs it is considerably above the average for all Swarthmore graduates (*see* Table 123, below). Further evidence to the effect that superior economic status may be favorable to fertility in a group characterized generally by high standards of living is suggested in a Vassar study (*see* Table 110).

TABLE 110

SIZE OF FAMILY OF MARRIED VASSAR ALUMNAE, CLASSES OF 1902–1911, ACCORDING TO OCCUPATION AND EDUCATION OF HUSBAND *

Occupation of Husbands (Mostly College Graduates)	Total Marriages	Per Cent Childless	Children per Fertile Marriage	Children per Marriage
"High-paid professional" Lawyers, Engineers, Physicians and Surgeons	290	12.8	2.8	2.4
"Low-paid professional" (mostly educators)	292	23.6	2.4	1.8
Non-professional (mostly business men)	536	15.9	2.7	2.3
Total	1,118	17.1	2.7	2.2
Husbands not college graduates [a]	cir. 200 [a]	—	—	1.8 [a]

* Adapted from Newcomer, 1931, "Marriages and Children of Vassar College Alumnae," *Vassar Quarterly*, Vol. 16, p. 101.

[a] This group is not included in original table but is described in text. The exact number is not stated but is described as "less than one-fifth" of the total.

Each of the items introduced in this section, considered by itself, is subject to criticism and would have to be regarded as inconclusive. But taken together these studies establish a fair probability that among families of the type represented in college alumni associations the most prosperous tend to be the most fertile. This tendency may be attributed to social contacts favorable to marriage and to comparative economic security which seems to be favorable to family increase. This suggests a very important principle, which may be formulated thus: *Among families with fairly high standards of living and with similar opportunities for voluntary parenthood, economic security and superior social status appear to be favorable to reproduction.*

Variation in income within the life cycle of persons with fairly fixed standards of living is another important phase of the influence of economic pressures in causing reduced fertility. In many families, especially in those of American business and professional men, the period of greatest economic strain comes at just the time when young people might otherwise be beginning to build up their families. A consideration of the economic situation of certain professional groups affords an adequate explanation of the extremely small families usually found in these groups. The following paragraphs from a report of the Committee on the Cost of Medical Care illustrate the economic strain to which young doctors and dentists are subjected. Both of these groups, as we have already seen, have very low birth rates. And both have a long period of training and a slow pick-up in earnings after graduation. The physicians have the more extended period of training but the dentists have a larger initial outlay for equipment.

Physicians

> "Three-fourths of the physicians who completed schedules spent from five to nine years in college, medical school, and intern training. Only 17 of the 185 devoted less than five years to their professional education. The average number of years spent in preparation for practice by all physicians is 7.4 years, the average for the complete specialists is 8.2 years, and for the other groups (general practitioners and partial specialists) 6.3 and 7.1 years, respectively" (Sinai and Mills, 1931, p. 15. Reprinted by permission of University of Chicago Press).
>
> "The amount invested during the last 10 years in professional equipment by the 146 Detroit physicians reporting ranges from less than $500 to more than $18,000. The average capital investment for all physicians is $3,227. One-half of the doctors have invested more than $2,266 and one-half less than that amount" (*ibid.*, p. 25).

Dentists

> "All but 15 per cent of the dentists replying spent either three or four years in dental colleges. Only one dentist spent less than three years, while, of the remainder, 11 per cent spent five years and 3 per cent six years. General practitioners and partial and complete specialists report approximately the same number of years given to preparation for practice" (*ibid.*, p. 32).
>
> "The reported capital investments in equipment during the past 10 years range from approximately $1,500 to $37,500. The mean for all is $5,937, while the median is $3,857. Capital investments of less than $2,000 are reported by only 13 per cent of the dentists. Slightly more than one-half estimate the value of their equipment as between $2,000 and $5,000, while 23 per cent place the value of their equipment between $5,000 and $10,000. More than $10,000 is invested in professional equipment by 13 per cent of the dentists" (*ibid.*, p. 43).

Variation in standards of child nurture and in the time and money costs of maintaining these standards in different types of communities also have important effects on variations in fertility. We may assume that in most items the costs of child care in different social classes are roughly proportional to general levels of living. But there are several items in which the costs of children mount disproportionately with higher standards of living. Young professional and business class families with slender means may be content with inexpensive housing, food, and clothing, but unwilling to accept inferior obstetrical service or inadequate health protection for children, and they may regard expensive higher education as an essential. Such conditions make large families seem impossible to persons with high standards of living and small income.

For example, if there are extremely wide variations in the initial costs of maternity care, the "standard" of a family for obstetrical care may very easily mount much more rapidly than the "standard" for other items, and much more rapidly than income. The costs of varying types of maternity care are indicated in the following excerpts from Dublin and Lotka, *The Money Value of a Man:*

Costs of varying types of maternity care

1. *With outpatient hospital or midwife service*

"The least expensive type of maternity care is that provided by the outdoor hospital service maintained by a few hospitals. Sometimes a flat rate of $10 is charged and sometimes service is absolutely free. This method of treatment, however, accounts for only a small proportion of confinements and is apparently diminishing in popularity, as shown by the declining number of births so attended. On the contrary, hospitalization of maternity cases is steadily increasing" (p. 24).

"In 1924, close to 20 per cent of all births in New York City were attended by midwives" (p. 26). Midwife service is also frequent in some rural areas. In Virginia in 1926 about 30 per cent of all deliveries were performed by midwives (p. 18).

"In the urban communities of the North, almost invariably the midwife charges less than a physician. A survey made by the Detroit Home Nursing Association in 1917 found that the prevailing fees for midwives' services, which included daily visits for 5 days or more, ranged from $7 to $10, the latter being the more general. Fees of general practitioners ranged from $10 to $30, with $20 and $25 being the more usual charges . . .

"In New York City, according to information supplied by the Department of Health, midwives now usually charge between $20 and $40, although a few ask as little as $15 and a few as much as $50. The fees of general medical practitioners serving patients of the same economic level range between $25 and $50. Usually they are between $40 and $50" (p. 17).

Range: $10–$50.

2. *With minimum hospital service*

"The minimum average maternity cost, when care is given in the hospital ward, is around $150. This estimate allows $50 for hospital expenses (the average amount charged in wards); $70 for service (hiring a working housekeeper), $25 for the baby's layette, and $5 for incidentals, such as hospital fees for prenatal care, the cost of which is very small, as only 25 cents is charged for each clinic visit" (p. 24).

Average: $150.

3. *With more adequate hospital service*

"For a more adequate type of hospital service, a minimum figure will be in the neighborhood of $250. Keeping the price of service, layette, and incidentals as before, the extra $100 will provide care in a semi-private hospital room instead of in a ward. There is a real difference in quality between these two types of service. In normal ward cases, delivery is given by senior interns under the direction of the house or visiting staff. In abnormal cases, the visiting physician does the actual work himself. In the semi-private rooms, on the other hand, service is given by one of the staff obstetricians. Semi-private patients need not attend the public prenatal clinics, but are entitled to private consultations with the staff doctor who is to attend them. The average hospital bill for such semi-private service is about $150. This is probably the type of treatment most commonly selected by families in the $2,500 income class, for records of a few of the large maternity hospitals show that patients are almost equally divided between the wards and private rooms; and since all women of the very low income levels must go into the wards, most of the women financially better off apparently choose the more expensive service. Instead of treatment by the house obstetrician, the semi-

> private patient can have her private doctor take care of her at approximately the same cost" (pp. 24–25).
>
> Average: $250.

4. *With superior service*

> "Those who insist on the service of a skilled obstetrician must be prepared to pay much larger fees. Two hundred dollars is considered a minimum fee for the service of a specialist and the other necessary items then mount proportionately higher to a total of not less than $500. Among the well-to-do, the resulting costs probably do not fall much below $1,000" (p. 26).
>
> Range: $500 and up.

The varying time costs of the care of children are perhaps of even greater importance in influencing size of family under different conditions. Most of the housing of modern cities has been planned with little or no concern for the needs or interests of children. Traffic conditions often make free, outdoor play for small children wholly impracticable. The resultant increase in strain on urban mothers who take their maternal responsibilities seriously becomes very great.

Lindquist, 1931, has described the chief sources of "fatigue, worry, and friction" reported by 306 mothers, members of the professional home economics fraternities, Omicron Nu and Psi Upsilon Omicron. Over one-third of these mothers had only one child at the time of the report; about one-third of them had two children; 30 per cent of them had three or more children. The median family income reported is about $3,500. All except 10 per cent of the families live in towns or cities. Practically all of these mothers, in answering a questionnaire regarding sources of fatigue, worry, and friction mentioned child care as an important source of fatigue; and most of them listed this as their principal source of fatigue. Child care was also mentioned much more frequently than any other item as a cause of friction in the home. Child care was also mentioned somewhat more frequently than care of house, or finances, or clothing, as a cause of worry. Some of Lindquist's comments on these reports are cited here.

> "Fatigue of the mother is recorded far more frequently than either worry or friction, but it appears to bear a close relation to both of these . . . The responsibility of caring for and training children is the one which occasions the most comments from these mothers . . . The fact that one is always on call limits the completeness with which many relax. Lowered physical reserve following the period of childbearing makes the strain a doubly heavy one for some.
>
> "If there can be some time daily or weekly when young children are satisfactorily cared for by persons other than the mother, a new perspective and a new lease on life are gained. The refreshment and relaxation which 'time out' affords enables these women to secure, or maintain, their poise and to evaluate affairs of the household much more wisely than they are able to do when they are constantly 'on the job acting as philosopher, judge, and peacemaker.' . . .
>
> "An analysis of the situations which exist in the families where women find these activities [washing and ironing] particularly fatiguing shows that it is the mothers of young children, without help, who become weary in the attempt to fit these activities into a week of constant, but often uncertain, demands . . .

> "The processes carried on in keeping the house clean and orderly are, in order of frequency, a third source of fatigue. Although seasonal cleaning is mentioned specifically by slightly less than one in ten, one in four finds that the sweeping, dusting, and mopping which must be done daily or weekly reduce the physical reserve. Particularly is this true in the homes where there are one or two young children and little or no available service either from the family or from paid workers. The degree to which the husband assumes responsibility in the home and his attitudes toward the standards which his wife is attempting to maintain seem to be factors of considerable importance" (pp. 34–38).

Data on time spent in various household duties have been collected and analyzed by Hildegarde Kneeland of the United States Bureau of Home Economics. Some of the results of this investigation have already been described in other publications [*see* Dorsey in *Household Management and Kitchens* (pp. 27ff.), and Ogburn in *Recent Social Trends in the United States* (pp. 669 ff.)]. We find that 559 farm homemakers reported an average of 61.2 hours of work per week, including farm work. Only 10 per cent of this time was used for "purchasing and management" (2.2 hours) and "care of family" (3.9 hours), combined. In the case of about one-fifth of these women who had children under one year of age the average working period per week jumps to 74 hours. Since the farm women who coöperated in this study were taking an active part in the adult education program of the coöperative Extension Service of the Department of Agriculture this increase in time reflects in part the influence of high sanitary and child-training standards. The strain, even for a year, of ten hours' work per day, seven days a week, for farm women with high standards of child care but with little or no paid help is obviously a severe one.

In the case of the 400 urban families of superior educational and economic status studied by Kneeland, the work of the homemaker was supplemented on the average by 33.9 hours of help received, chiefly paid service. These homemakers, half of whom had infants under one year of age, report that they spent an average of 46.1 hours per week, in work connected with homemaking of which about one-fourth was spent directly in care of the family. In the case of the 200 women in this series with children under one year of age, the time devoted by the homemaker to household tasks is raised to 58 hours per week, on the average, and the amount of paid help is raised to 40 hours per week on the average. Hours spent by homemakers with children out of doors or at entertainments are not included in working time in either series. Eight hours a day, seven days a week, by women who approach the situation of the "leisure class," during the times when their children are infants constitutes a really serious load. In the case of women with similar standards of child care, who are not able to afford as much help as the average, the strain of child nurture obviously becomes much greater.

It is not surprising that many of these women come to feel that the difference in joy and pride between a family with two or three children and a family with five or six children is not great enough to compensate them for the continued load. Emotional needs for children may or may not diminish rapidly after the first few have arrived, but the time and money (or, time or money) cost of each successive child remains fairly rigid.

With high health standards and with the present standards of sanitation, nutrition, and child training, the costs of childbearing and child nurture have risen in some groups far above those which still prevail in other groups—and frequently these variations are out of all proportion to differences in income.

There is little direct evidence that specific provisions for alleviating the cost of child nurture to parents affect size of family, although various measures of this sort have been introduced in some European countries. Family allowances and subsidies for children have been developed extensively in France. Such provisions were at first, ostensibly at least, a measure designed to combat the rising cost of living during the war and early post-war periods; economic, military-patriotic, and to some extent, religious interests motivated their development. The scheme was generally favored by reformist organizations, although opposed by certain labor groups, such as the Confédération Générale du Travail. The French provision for family allowances for employees of the national government was adopted April 7, 1917. The system soon came into force in a majority of the departmental governments; and it was rapidly introduced in a variety of industries. The system became very popular. Allotments were rapidly increased. A central fund provides equalization of payments in most instances, so that the individual industry is not affected by the proportion of employees who have large families. According to the 1925 budget, the scale of annual payments to state employees for each child was as follows:

	Francs	Equivalent in Dollars at .04 per Franc
1st child	540	21.60
2nd child	720	28.80
3rd child	1080	42.40
4th child	1260	50.40

Payments are made for all children under sixteen, and in some cases for all dependent children under twenty-one. By 1926, according to estimates sponsored by the Child Welfare Committee of the League of Nations, about 3,600,000 heads of families (private industry and government service combined) in France were receiving annually a total of about 1,152 million francs, making the average per family somewhat above twelve dollars per year (p. 5).

A still more direct encouragement to French patriots to produce large families was the national provision of an annual bonus (to be paid through the thirteenth year) for each child after the second. This annual bonus was increased to 120 francs in 1926, and to 125 francs (about five dollars) in 1927. In addition there are legally established confinement leaves with pay and breast-feeding allowances for employed women, and various minor economic aids.

These economic measures have been coupled with patriotic appeals, frequently enforced with religious sanctions. A law against public discussion of birth control was passed in 1921. These measures have certainly not resulted in any great increases in birth rates, except the temporary rise which occurred in all European countries in the years immediately following the cessation of the War. On the other hand, the French birth rate has ceased to decline and remains stationary at about the pre-war level, while birth rates in Sweden, England, Germany, and Switzerland have dropped to a natality level below that of France. If the proportion of women of childbearing age in the total population of each country is taken into account, the specific birth rate for France still remains well above the corresponding rates for England, Germany, Switzerland, and Sweden.[7] (*See* Table 111).

TABLE 111

Birth Rates in Specified European Countries in 1911–1914 and in 1929–1931

	Rates per 1,000 Total Population at Specified Period				Births per 1,000 Women Aged 15–49, 1931, Estimated on Basis of Age-Distribution Data, 1921[c]
	1911–1914[a]	*1929*[b]	*1930*[b]	*1931*[b] *Jan.–June*	
Sweden	23.5		15.9[d]		62
England and Wales	24.1	16.3	16.3	16.3	58
Germany	27.8	17.9	17.5	16.85	58
Switzerland	23.5	17.1[e]	17.2[e]	16.7[e]	60
France	18.6	17.7	18.1	18.25	66
Norway	25.3	17.5	17.2	16.95	67
Holland	28.1	22.8	23.0	22.9	90
Italy	31.7	25.2	26.0	25.95	101

[a] Kuczynski, Robert R., *The Balance of Births and Deaths; I, Western and Northern Europe*, p. 7; *II, Eastern and Southern Europe*, p. 135. Populations of Germany and France adjusted by Kuczynski to post-war territories.

[b] *Bulletin Mensuel, Institut International de Statistique*, December, 1931, p. 55.

[c] Based on general birth rates as given in last previous column and proportion of women of childbearing age in total populations except in case of Sweden. Kuczynski, *The Balance of Births and Deaths; I, Western and Northern Europe*, pp. 106–110; *II, Eastern and Southern Europe*, p. 142.

[d] *Statistisk Årsbok för Swerige*, 1931, pp. 9, 34. Rate for 1926–1930.

[e] *Statistisches Jahrbuch der Schweiz*, 1931, p. 47. Birth rate for year, 1931.

The stabilization of fertility in France during recent years may be simply the reaction of a population long exposed to family limitation practices.

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[7] Birth rates for several European countries are shown in the accompanying table for the periods 1911–1914 and 1929–1931. The birth rates per 1,000 women aged 15–49 years, which would be characteristic of these countries if the proportions of women of childbearing years in the total population of different nations in 1931 had been the same as in 1921, are shown in the last column —except in the case of Sweden, where the proportion of women is derived from 1928 data. The hypothesis used here is, of course, not strictly accurate, but it is unlikely that the relative rates for different populations are very much affected by errors due to this procedure, because age distributions in national aggregates change slowly. The pre-war rates for France and Germany have been adjusted to the post-war territories.

It may be influenced by the relatively stable economic situation in France in the post-war period, as compared with England or Germany. It is also possible that the composition of the present generation of young adults in France is influenced by selective processes operative on the preceding generation, so that a somewhat larger proportion of stocks which are disposed toward large families may now characterize the population at child-bearing ages.[8] On the other hand, it seems likely that this stabilization is in part the result of the conscious effort which has been extended in this direction by French authorities. It is even more difficult to appraise the possible effects in Italy of the Fascist effort to check the decline of the birth rate.[9]

The effect of family allowances on the fertility of particular social groups is still more doubtful. Some light may be thrown on the subject by an examination of unpublished data collected from English non-conformist clergy in 1930 by a committee of the American Eugenics Society.[10] A request for certain information was sent in the name of "The Committee on Coöperation with Clergymen of the American Eugenics Society," to clergymen of four denominations. A total of 1,587 replies were received, whereof 299 were incomplete or blank.[11] There are practically no indications of resentment against the inquiry. The only bias apparent in the make-up of the sample is caused by the failure of a considerable number of childless couples (so specified in 42 cases) to make complete returns, presumably because they felt that the questionnaire did not apply to them. Altogether 975 replies were received from clergymen whose wives were aged 40 years or over at the time of the report. These are distributed about evenly among four denominations, as follows: Wesleyan Methodist, 262; Primitive Methodist, 242; Baptist, 216; and Congregational, 255.

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[8] In this connection, see the reversal of reproductive trend in a total population with constant rates for all component groups, Figure 8.

[9] The natality per 1,000 married women aged 15–49 in Italy fell from 250 births per year in 1881 to 220 births in 1921, and the decline continued gradually during the following years (Gini, p. 707). This decrease was wholly concentrated in the northern provinces. Fertility in the northern provinces in 1881 did not differ appreciably from that in the southern provinces; but in 1921 the average number of births per year per 1,000 married women, aged 15–49, for Piedmont and Liguria was only 147 in contrast to an average of 258 births per year for the six most southern provinces (including Sardinia) (Gini, p. 707). The Fascist government launched its "demographic battle" in 1926 and 1927—with laws against dissemination of contraceptive information (1926), establishment of a bachelor's tax (1926), the fervid appeal of Il Duce in the "Speech of the Ascension," May 26, 1927, and provisions for various economic exemptions and awards for large families (1928). A slight advance in the birth rate in 1930 was hailed with delight by Italian authorities; but this was followed by marked decreases again in 1931 and 1932. Data on changes in recent fertility in different provinces are not available at the time of writing.

[10] The data for this analysis were kindly put at the disposal of the writers by Henry S. Huntington, Chairman of the Committee.

[11] Indications regarding the incomplete or blank returns are as follows:

Respondents "single" or "recently married"	70
"Retired," "children grown up," "wife dead," etc.	114
"No children," or "no children at home"—frequently with no indication of age or marital condition	42
"Does not apply"—not further specified	7
No indication of reason for rejection, advice proffered instead of information, miscellaneous	66
Total incomplete replies	299

A system of family allowances for clergymen has been in force throughout the entire married lives of the Wesleyan Methodists and the Primitive Methodist ministers in the sample, with a few exceptions among the oldest couples. The allowances have varied in different districts, but have usually been higher among the Wesleyans, who also receive higher regular stipends than the Primitive Methodist ministers. The allowance per year per child under eighteen years of age ranges from five pounds (pre-war rate among Primitive Methodists) to 8, 10, 12, and occasionally 20 to 22 pounds. Since the War, additional educational allowances during a six-year period have been added. Thus two groups in this sample, Wesleyan Methodists and Primitive Methodists, have received allowances, amounting to a total of about one hundred dollars per year, at the lowest rates, in the case of a couple with four children. The usual salaries in these denominations range from about fifteen hundred to about twenty-two hundred dollars per year. The other two groups, Baptists and Congregationalists, have not received family allowances. Their normal salary expectations are similar to the Wesleyan Methodists, and somewhat higher than the Primitive Methodists. The Primitive Methodist clergymen are expected to serve a four-year probationary period before they are permitted to marry. The four groups, with the possible exception of the group last mentioned, may be supposed to have similar general philosophies and ways of living.[12]

The ratio for each denomination of the number of "unlimited families" (reporting three or more children and stating, "Economic considerations have not influenced us in regard to size of family") to the number of "economically limited families" (reporting less than three children and stating that "Economic considerations have limited us in regard to size of family") is shown in Table 112. The average total income of the "economically limited" and the "unlimited" families is also shown here.

It is apparent that the percentage of cases classified as "unlimited" by economic considerations is not any lower in the two Methodist groups, which have the advantage of family allowances, than in the other two groups, but the numbers are small and the evidence cannot therefore be regarded as conclusive. Within each denomination we find a slightly higher average income reported for the "unlimited families" than for the families described as "economically limited." However, so far as the results of this particular experiment are significant, they do not lend encouragement to the idea that moderate family allowances for children may be expected to have an appreciable influence on size of family in a serious-minded, low-paid professional group.

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[12] The data, when analyzed by age of wife at time of the report, shows a considerable increase among the younger women in the percentage of couples stating, "Economic considerations have influenced us in regard to size of family." This reply is given by only 10 per cent of clergymen with wives over 60 years of age, by 20 per cent of those with wives aged 50–59 years, and by 33 per cent of those with wives aged 40–49 years. This increase, however, seems to be almost wholly at the expense of the percentage neglecting to answer this question. *See* Appendix U.

TABLE 112

Number of Families Classified as "Economically Limited" and Number Classified as "Unlimited" in 975 Replies by English Non-Conformist Clergy in 1930, Wives Aged 40 Years or Over, by Denominations, with Data on Income—Exclusive of Couples Married Less than Ten Years

	Numbers of Families				
	Wesleyan M.E.	*Primitive M.E.*	*Baptist*	*Congregationalist*	*Total*
(A) "Economically limited" families	24	36	21	27	108
(B) Families classified as "unlimited"	11	17	11	13	52
Ratio of "economically limited" to "unlimited" families	2.2	2.1	1.9	2.1	2.1
	Average Income in Pounds[a]				
	(not including family allowance)	(not including family allowance)			
(A) "Economically limited" families	364	319	326	363	338
(B) Families reported as "unlimited"	381	336	444	425	391

[a] Highest stipend reported, plus additional income (except family allowance) at time of report.

We have found some evidence that economic security is favorable to "birth release" among established, well-to-do families. Among depressed families, on the other hand, a deepening of poverty may tend to destroy all economic incentive, and thus to increase fertility. People in such circumstances may feel that after all they have little to gain by strenuous adherence to some family limitation practice; and even where there is a strong will to limit fertility among such families, reliance is often placed on ineffective methods. Thus, wealth and poverty both seem to be conducive to high fertility, when other factors are held constant; but among middle class families, who are committed to standards of living which they can barely maintain and who are haunted by a sense of economic insecurity and strain, there is a powerful economic incentive toward stringent family limitation. This incentive is presumably heightened by violent fluctuations in business conditions.

We may conclude that among families with high standards of living—and this phrase should in most cases be understood as concern for a fair degree of comfort and opportunity for the cultivation of individual interests or hobbies, rather than the "craving for pleasure, luxury and power" against which moralists are prone to inveigh—fertility at or above the replacement level is essentially dependent on a fair degree of economic security, realized in the early period of married life.

Evidence now available on the effects of specific measures designed to transfer part of the economic responsibility for the nurture of children from their parents to the community at large is meager and inconclusive; but this subject deserves further experimentation and more systematic study.

5. *Local Environment and Housing*

Abundant data show that size of family decreases within any given area progressively from open country to villages, from villages to towns, from towns to cities of moderate size, and from small cities to large cities. Moreover, the negative influence of the large city on fertility is found to extend into the open country for a long distance; farm populations in counties near a metropolis almost universally have lower ratios of children to women than the farm populations in more remote counties in the same general region. It is difficult to determine to what extent this situation is a temporary one, representing one phase in the spread of the family limitation pattern and to what extent this situation is due to persistent economic and social conditions.

Larger families are ordinarily found in the residential suburbs of a metropolitan area than at the center. But this may be due to the tendency of families with several children to move from the center of a metropolis to a suburban location. It seems probable, however, that the development of residental suburbs may exercise some influence toward increase in size of family. Housing facilities, accommodated to small families, create serious embarrassment for large families. The reader may remember that, according to the data supplied by Green, the economic areas including large apartment houses show a distinct drop in birth rates and ratios of children to women in comparison with all other economic areas (*see* Chapter IV, above).

During the decade 1920–1930, although there were marked increases in the average floor space in apartment houses in metropolitan areas, there was in general a decrease in the average number of rooms per apartment, and a disappearance of facilities for household production, according to McKenzie, 1933, "The Rise of Metropolitan Communities" in *Recent Social Trends in the United States.* The amount of residential floor space constructed per person in the United States increased from 209 square feet in the four years prior to American entry into the World War to 286 square feet in 1927 (p. 473). During about the same period, building permits for multi-family dwellings increased from 34 per cent of all permits in 1921 to 64 per cent of all permits in 1929 in the fourteen largest cities of the United States. The percentage of permits issued for multi-family dwellings, however, increased less rapidly in other large cities, and remained practically constant at about 10 per cent of all permits in a series of independent cities with 25,000 to 50,000 population. McKenzie adds, "Only within the metropolitan regions does the apartment seem rapidly to be changing the manner of life of the people" (p. 475).

> "Although the size of the metropolitan apartment building and the amount of floor space per individual tend to increase, the family dwelling unit is growing

smaller. This may be explained by the diminishing size of the family itself. Evidence regarding the trend toward smaller apartments is fragmentary but nevertheless suggestive. A. G. Hinman has summarized the records of the Chicago City Health Department as follows:

> "Of 293,045 apartment units constructed in Chicago, the period 1913–1928, 6 per cent have one room; 12 per cent, two rooms; 14 per cent, three rooms; 29 per cent, four rooms; 24 per cent, five rooms; and 15 per cent, six or more rooms. The average size of apartment units in the buildings constructed in the period 1913–1919 is 4.6 rooms and in those built since 1924, 3.5 rooms.
>
> "The statistics published by the Regional Survey of New York show a similar tendency toward the smaller apartment:
>
> "In 1913 the average number of rooms per apartment in new construction was 4.19; in 1925 it was 3.63; in 1926, 3.49; in 1927, 3.39; and in 1928, 3.34" (p. 476).

It does not require any great exercise of the imagination to picture the effect of such developments in accelerating the tendency toward family limitation in large cities.

It would be interesting to know to what extent housing projects carried out in Stockholm and in Berlin may have influenced the reversal or disappearance of the social class differentials in these cities, while they have persisted in some other European capitals. It is probable that slum conditions are conducive to attitudes of indifference, despair, and neglect that usually seem conducive to high fertility.

We have cited evidence to show that differential fertility among social groups is apparently much less in force among farm families than among city dwellers (*see* Chapter IV). However, the social class differentials were apparently quite as large in villages as in cities among native whites in the Northern United States in the period ending in 1910, represented by the Milbank sample. This is a matter of large importance, and further investigations of this subject should be undertaken.

6. *The Influence of Gainful Occupations of Women on Fertility*

In the period between 1870 and 1930, the number of gainfully employed women gradually increased in proportion to the number of men gainfully employed. It happens that increase in the number of women gainfully employed was just sufficient to balance the decrease in number of children gainfully employed, so the lines showing "total gainfully employed" and "men gainfully employed" when plotted on a logarithmic chart are found to be almost exactly parallel (*see* Figure 52). Furthermore, during this period important changes were taking place in the occupations pursued by women. Increasingly larger proportions of women, from 1870 to 1930, are found in professional service, clerical service, and trade; whereas the proportions engaged in manufactures and mechanical industries and (except during the last decade) in domestic and personal service have declined (*see* Figure 53).

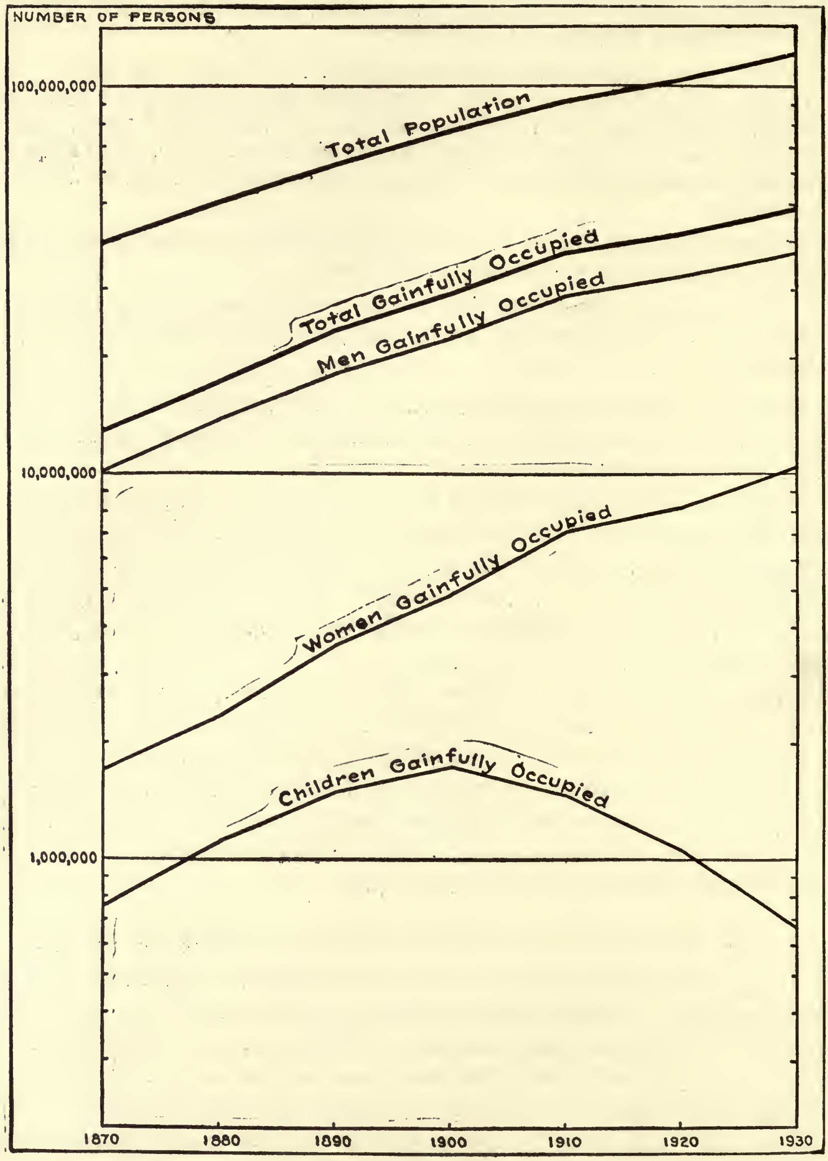

Fig. 52. Growth of Total Population of the United States and of Population Gainfully Employed, for Men, Women, and Children, 1870–1930. From Hurlin and Givens, 1933, "Shifting Occupational Patterns," *Recent Social Trends in the United States,* Vol. I, Chapter VI, p. 272.

The general negative relationship between employment of women and size of family has been shown in many studies. For example, Thompson, studying variations in effective fertility in different communities, concludes, "On the whole, there is an inverse relationship between these two factors, the fewer employed native women, the higher the ratio of children" (*Ratio of Children to Women 1920*, p. 57).

There has been a marked increase in recent years in the proportion of all gainfully occupied women who are married, but the married still constitute a small minority of the employed women. Excluding the widowed and divorced, 23.0 per cent of all gainfully occupied women in 1920 were reported as married; in 1930, the corresponding percentage was 28.9. The proportion of gainfully occupied women who are married (24.8 per cent) is somewhat lower among native white than in the general population. The proportion of married women is lowest in the case of teachers and clerical workers. This is undoubtedly due to the tendency to abandon these occupations after marriage or at least after children are born. The proportion of unskilled women workers who are married (about 33 per cent) is practically the same as the proportion of professional women, exclusive of teachers. Among women engaged in manufacturing and mechanical industries, 32.4 per cent

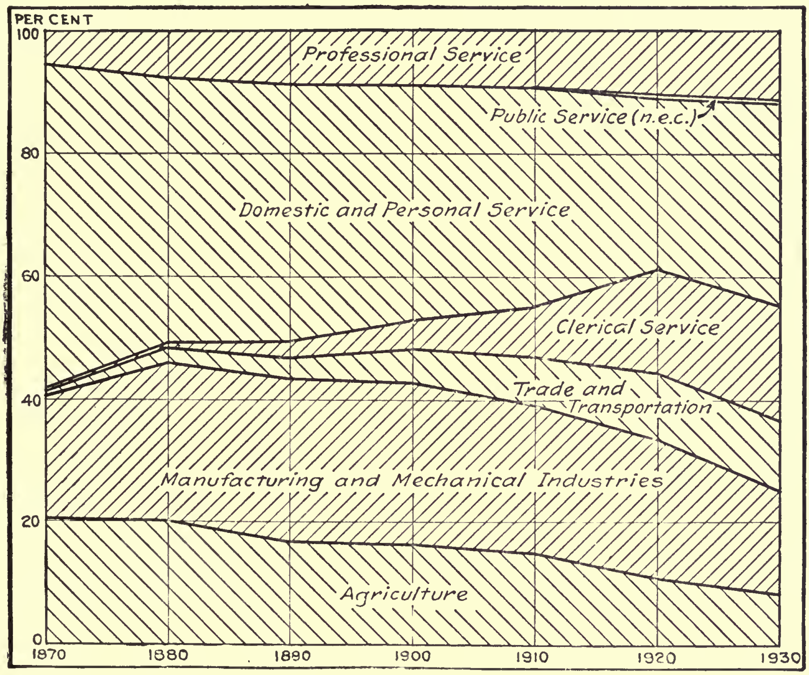

FIG. 53. DISTRIBUTION, BY OCCUPATION, OF GAINFULLY OCCUPIED WOMEN 16 YEARS OF AGE AND OVER, IN THE UNITED STATES, 1870–1930. Breckinridge, 1933, "The Activities of Women outside the Home," *Recent Social Trends in the United States*, Vol. I, Chapter XIV, p. 717.

are married, and the percentage is slightly higher for women in cotton mills and for women in shoe factories. Among the distinctive professional groups, about 33 per cent of the women who are actresses, architects, authors, lawyers, or physicians are married. Data on marriage and gainful occupations for an alumnae group are shown in Table 113.

TABLE 113

PERCENTAGE DISTRIBUTION OF LIVING BARNARD ALUMNAE BY MARITAL CONDITION AND OCCUPATIONAL STATUS, CLASSES OF 1897–1921, AS REPORTED IN 1930 *

Classes	Number	Ever-Married, Total	Married, and Gainfully Occupied	Married, Not Gainfully Occupied	Unmarried, Gainfully Occupied	Unmarried, Not Gainfully Occupied, or Unknown
1897–1901	129	51.9	14.7	37.2	31.0	17.1
1902–1906	311	56.3	14.8	41.5	32.8	10.9
1907–1911	435	58.3	14.9	43.4	34.7	6.9
1912–1916	615	59.1	15.8	43.3	33.4	7.6
1917–1921	749	55.7	17.9	37.8	38.5	5.9
1897–1921	2,239	57.0	16.1	40.9	35.1	7.9

* From data supplied by Occupational Bureau of Barnard College.

It is interesting to find that the proportion of Barnard graduates who have actually combined gainful employment with homemaking has remained quite constant during the thirty-year period represented in these statistics, at about 15 per cent. If this combination represents a collegiate ideal (*see* Section 8, below), it is apparently either frustrated or abandoned in the actual experience of most alumnae.

Gainfully employed wives are more frequently childless and have on the average fewer children than wives of similar background who are not gainfully employed. This tendency is clearly shown in Monroe's analysis of unpublished census data for Chicago families (*see* Table 114).

In a series of schedules from land-grant college women (principally with home economics training), we find that only 12.5 per cent of 370 married women who were not gainfully employed were childless, but that 27.7 per cent of 80 married women who were gainfully employed at the time of the report were childless—limiting the analysis to schedules received from women who had been out of college more than twenty years [13] (*see* Woodhouse, pp. 56–58). The average number of children per mother among those not gainfully employed (2.8 children per mother who had matriculated in the period 1889–1892, 2.6 per mother who had matriculated in the period 1899–1902) was also considerably higher than the corresponding figure for mothers who were gainfully employed (2.3 children per mother, for both of the corresponding matriculation periods). There is some suggestion in Mrs. Woodhouse's data that the fertility of the women engaged in teaching may be

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[13] Schedules received in 1927 from women matriculating 1889–1892 and 1899–1902.

TABLE 114

NUMBER OF PERSONS IN UNBROKEN PRIMARY FAMILIES (INCLUDING MULTIPLE FAMILIES), ACCORDING TO EMPLOYMENT STATUS OF WIFE AND OTHER CRITERIA. WHITE FAMILIES, CHICAGO, 1920 *

Groups	Number of Families	Distribution by Number of Children or Other Persons in "Unbroken Family" besides Husband and Wife [a]				
		None	*One*	*Two*	*Three or More*	*All Numbers*
Total, all ages		Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
Wife earning	3,492	41.4	21.1	16.0	21.5	100
Wife not earning	16,661	24.6	24.1	20.7	30.6	100
Total, wife aged 35–44 years						
Wife earning	999	36.8	17.1	16.2	29.9	100
Wife not earning	4,439	18.4	17.1	19.4	45.1	100
Groups according to occupation of husband (all ages of wives):						
Unskilled and semi-skilled wage earners						
Wife earning	1,134	32.7	19.3	18.7	29.3	100
Wife not earning	4,542	19.7	21.4	19.8	39.1	100
Skilled wage earners						
Wife earning	801	38.6	22.2	17.0	22.2	100
Wife not earning	4,108	21.7	24.0	21.4	32.9	100
Low- and medium-salaried employees						
Wife earning	661	54.8	19.5	13.9	11.8	100
Wife not earning	3,178	29.4	27.2	21.0	22.4	100
Independent business men						
Wife earning	460	36.7	20.7	17.6	25.0	100
Wife not earning	2,494	21.9	22.6	22.1	33.4	100
Professional men						
Wife earning	228	59.2	25.0	9.7	6.1	100
Wife not earning	1,008	38.4	27.4	18.6	15.6	100
Executives and officials						
Wife earning	99	—	—	—	—	100
Wife not earning	762	34.1	27.7	22.7	15.5	100
Men without occupation						
Wife earning	109	44.9	28.4	3.7	23.0	100
Wife not earning	569	33.9	24.8	15.5	25.8	100

* Adapted from Monroe, 1932, *Chicago Families*, pp. 212–213. Reprinted by permission of University of Chicago Press.

[a] An "unbroken family," in these statistics, embraces only persons having a marital or parent-child relationship and living in one household that includes husband and wife living together.

higher than that of their classmates who are in other paid occupations, but the numbers are not sufficient to afford conclusive evidence on this point. We shall also introduce other data with similar general import, derived from an analysis of the family records of 1,000 married women listed in *Who's Who in America, 1926–1927.*

There can be no doubt that the negative relationship between occupation of women and fertility is a two-way relationship. It is very probable that the more important causal sequence is that from low fertility to gainful

TABLE 115

FAMILY RECORDS OF 1,000 WOMEN IN "WHO'S WHO IN AMERICA, 1926–1927"*

Occupational Group	Number Considered	Number Reported as Married	Per Cent Reported as Married	Per Cent Reported as Married and Not Widowed or Divorced	Average Age at Marriage	Per Cent of Wives Not Reporting Children	Average Children per Wife with Children
Authors	398	218	60.9	50.57	26.2	48.2	2.6
Artists	193	109	57.0	47.67	26.9	67.0	2.1
Editors, physicians, lawyers, etc.	81	47	58.0	35.25	30.6	60.8	2.2
Librarians	29	4	13.8		—		
Educators	125	30	24.0	15.20	31.8	60.0	1.9
Research authorities	86	29	33.7	25.81	28.5	52.0	2.4
Social workers, professional	34	16	47.1	50.79	28.5	47.9	2.5
Social workers, other	94	78	82.9		24.9		
Total	1,000	531	53.1	42.00	27.1	54.0	2.4

Average number of children reported:

Per woman reported as mother	2.43
Per woman reported as married	1.12
Per woman	0.59

* Arranged from Cope, "The Women of 'Who's Who,' " *Social Forces*, Vol. 7, pp. 213, 215, 217.

occupation. Single, widowed, and divorced women naturally turn more to activities outside the home than do married women; and childless wives, or those with small families, are likewise more apt to seek employment than those who have large responsibilities at home. On the other hand, there quite certainly is some causal sequence in the other direction, especially in the case of women engaged in responsible and fairly lucrative positions. Such women may naturally be somewhat more hesitant about marriage or childbearing. They are likely to postpone childbearing in order to accumulate some financial reserve, or under stress of unusual demand in their work; and in the matter of childbearing, postponement always means reduction of expectation. Whatever may be the proper causal interpretation of the situation, the fact remains that full-time gainful occupation of women has not as yet been found compatible with effective reproduction in any large group—although many striking exceptions can be cited.

Perhaps a new adjustment between professional activities and effective reproduction may still be achieved. At any rate it seems likely that the present generation of college women are committed to the experiment. Eunice Fuller Barnard, in the article, "The College Girl Puts Marriage First," interprets the mind of college women today in this matter as follows:

> "Although marriage is the cynosure of the college girl, it is by no means all of her picture of her future. Before marriage, especially in the women's colleges, she has usually plotted out for herself three or four intensely active years in

> business or a profession or graduate study. Paradoxically enough, simultaneously with the universally expressed wish to marry has come an almost equally universal desire for a job. Year by year for the past decade, even before finances affected the picture, this new urge has grown until now—when jobs are scarce—almost the whole senior class is registered with the vocational bureau. . . .
>
> "On this point observers in all the colleges agree. 'Undergraduates are troubled,' said Dean Thompson of Vassar, 'if they have no vocational aim.'
>
> "'Fewer girls stay at home after graduation,' said Mr. Woellner of the University of Chicago vocational guidance bureau. 'Many more are going directly into work or study of some kind. Five years ago it was hard to get them out to vocational lectures. Now they come in as large numbers as the men.'
>
> "The girl of today has a horror of the boredom of idleness, I was told at Smith and Bryn Mawr. She wants to continue the activity of her college years in something that seems worth while. Moreover, she often wishes to begin earning immediately, either to justify to herself her college education or to repay her parents for their sacrifices."

Some students of the problem, among them the English writer, Jane Ayling, have great hope in the possibility of reducing the burdens of the mother by various maternity services, community nurseries, and so forth. Others see the solution of the conflict between the surplus intellectual energies of educated women and the responsibilities of parenthood in a greater development of part-time activities of various kinds, both paid and voluntary.[14]

7. *Religion*

Some modern liberals hold that social concern for the amount and character of human reproduction may be regarded as a religious attitude. This point of view is unacceptable to traditional religions, which hold that natural increase is solely the concern of deity. Human interference with fertility is generally repugnant to orthodox religious systems, Hebrew (orthodox), Christian (Roman or Greek Catholic or Protestant fundamentalist), Mohammedan, Mormon, Hindu, or Confucian. The well-known position of the Roman Catholic Church in this matter simply canonizes under recognized, contemporary authority, the tacit attitude of most traditional systems. Where such systems remain intact, e.g., among fundamentalist Protestants in the rural South, or among Mormons in the vicinity of Utah, or among pious Roman Catholics, resistance is offered to the introduction of family limitation practices. This resistance is, of course, less persistent where central authority is lacking. Resistance to all types of family limitation, as such, has largely disappeared among liberal Jewish and Protestant peoples, and among many persons otherwise conservative in religious attitudes. All this is, of course, common knowledge.

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[14] This suggestion may possibly receive some support from variations in the frequencies of marriage and motherhood among the women in *Who's Who in America*, the highest marital proportions being reported for (1) social workers other than professional, and (2) authors, artists, editors, physicians, lawyers, and so forth. If separate analysis for size of family were available for social workers other than professional, it would probably also appear that the wives in this group have the largest families, followed by authors (*see* table above).

Some social scientists, however, are inclined to doubt that religion, as such, exercises any considerable influence on birth rates. Such students attribute the apparent differentials in fertility between different types of religion to differences in habitat, occupation, and education, characteristic of various religious groups. Another critical problem is the extent to which religion, in so far as it does influence birth rates, serves merely to delay the introduction of the small family system in any group, and to what extent religion is able to effect a persistent resistance to family limitation after such practice has begun to gain a foothold among any people. Unfortunately, data bearing critically upon either of these problems is extremely meager, so far as the United States is concerned, because of objections against religious classification in census and public school data.

Among all men listed in *Who's Who in America 1926–1927* who report religious affiliation, there is an average of 2.9 children per father. In the case of all such men who do not report religious affiliation the average is 2.7 children per father. This latter figure is the same as that for Congregationalists (2.7) and slightly higher than that for Jews (2.6). The averages are considerably higher for Baptists (3.1), Lutherans (3.3), Roman Catholics (3.3), and Mormons (5.3) (*see* Huntington and Whitney, p. 342).

TABLE 116

NUMBER OF CHILDREN EVER-BORN PER 100 FAMILIES IN ROTTERDAM, CLASSIFIED ACCORDING TO OCCUPATION OF FATHER AND RELIGION OF PARENTS. DATA OF JANUARY 1, 1929 *

Occupational Class	I Dutch Reformed	II Calvinist	III Roman Catholic	IV Jews	VII Mother Roman Catholic, Father Protestant	VIII Mother Protestant, Father Roman Catholic	IX Other Mixed Marriages
A. Owners and professionals	251	—[a]	—[a]	—[a]	—[a]	—[a]	215
B. Officials	230	—[a]	—[a]	—[a]	—[a]	—[a]	192
C. Tradesmen	325	423	407	268	248	280	237
D. Skilled workers	285	—[a]	333	—[a]	267	256[b]	196[b]
E. Semi-skilled workers	321	411	339	—[a]	274	292	268
F. Unskilled workers	440	463	398	—[a]	322	325	333
All occupations	325	409	367	272	283	294	254

* Adapted from Sanders, *The Declining Birth Rate in Rotterdam*, pp. 15, 21, 129–134.

[a] Less than 100 cases.

[b] Less than 200 cases.

Sanders' study of fertility in Rotterdam gives an analysis of differentials among religious bodies within each main occupational class, and also an analysis of secular changes in fertility rates for different denominations (but with no separate analysis by occupational classes in this case). The results of this analysis are shown in Table 116 and Table 117. We find that rates for Calvinists (an orthodox Protestant sect) and for Roman Catholics are higher than for most other sects, even within given occupational classes, and especially in the upper occupational classes. However, the general decline in the birth rate during recent years, which in Rotterdam has involved a marked reduction in social class differentials in fertility, has also involved an equally conspicuous diminution of the differences in fertility between religious denominations.

TABLE 117

NUMBER OF CHILDREN EVER-BORN PER 100 FAMILIES IN ROTTERDAM, CLASSIFIED ACCORDING TO DATE OF MARRIAGE AND RELIGION OF PARENTS. DATA OF JANUARY 1, 1929 *

Year of Marriage	I Dutch Reformed	II Calvinist	III Roman Catholic	VII Mother Roman Catholic, Father Protestant	VIII Mother Protestant, Father Roman Catholic	IX Other Mixed Marriages
1879–1893	622	—	597	—[b]	—[b]	—[b]
1894–1903	517	552	545	541	495	437
1904–1913	371	485	413	367	347	339
1914–1918 [a]	271	355[c]	310	258	276	258
1919–1929 (incomplete families)	147	209	180	152	150	140

* Abridged from Sanders, *The Declining Birth Rate in Rotterdam*, pp. 43, 140–141.

[a] Including some incomplete families.

[b] Less than 100 cases.

[c] Less than 200 cases.

It seems only reasonable to suppose that differences in religious attitudes affect variations in fertility; but such differences in many cases reflect differences in residential location, national origin, and social class. Religion, apart from these other variables, is probably a relatively minor factor in the determination of fertility trends.

8. *Education*

Analysis of the reproduction rates of social groups has already provided evidence of a negative relationship between educational advance and fertility. Before we discuss the causes, it will be well to consider some special data which bear directly on this relationship. Census data showing number of children per private family in relation to literacy of parents are available for Canada. It is interesting to find that in Quebec among the French, and in Prince Edward Island, the expected negative relationship between literacy and numbers of children does not appear, although this relationship is apparent for the Canadian-born population in all other parts of the Dominion. It is possible that the decimating effects of high mortality among the children of illiterate mothers may reduce the size of their families in comparison with the families of literate mothers in regions where large families are universal; but in other regions such differences in survival rates may be of minor importance in comparison with extreme differences in birth rates between literate and illiterate parents. Some of the variations in particular provinces are undoubtedly mere chance irregularities. Data on size of family do not, of course, afford exact index of variations either in fertility or in reproduction rates.

TABLE 118

NUMBER OF SURVIVING CHILDREN, BOTH PARENTS CANADIAN-BORN, ACCORDING TO LITERACY OF PARENTS, IN THE DOMINION OF CANADA, AND IN EACH PROVINCE *

Population	Number of Children per Family			
	Both Parents Literate	*Mother*[a] *Illiterate*	*Father*[a] *Illiterate*	*Both Parents Illiterate*
CANADA, TOTAL	3.12	3.70	3.97	3.59
Rural	3.26	3.94	4.09	3.86
Urban	2.75	3.42	3.55	3.31
Prince Edward Island	3.17	3.49	3.46	2.98
Nova Scotia	3.13	3.66	3.65	3.33
New Brunswick	3.23	4.12	4.19	4.03
Quebec	3.78	3.64	4.08	3.53
Ontario	2.65	3.65	3.65	3.62
Manitoba	2.96	3.77	3.95	3.71
Saskatchewan	2.96	3.51	3.96	3.41
Alberta	2.76	3.83	4.21	3.63
British Columbia	2.44	2.96[b]	2.96[b]	2.86[b]
QUEBEC				
Rural	4.22	3.93	4.28	3.71
Urban	3.27	3.40	3.63	3.23
ONTARIO				
Rural	2.84	3.65	3.70	3.55
Urban	2.48	3.38	3.31	3.34

* From the *Sixth Census of Canada*, 1921, Vol. 3, Population, pp. 94–102.

[a] Where one parent only is specified as illiterate, the other parent was reported as literate.

[b] Less than 100 families.

The data for Canada, presented above, show in general a negative relationship between literacy and large families. Exactly comparable data are not available for the United States, but it is likely that illiteracy is an important factor in preserving the high fertility rates in backward sections of this country.

Various studies also show that smaller families are usually found among high school graduates than among those who have received only elementary schooling. And it has long been recognized that the families of college graduates, as a class, are small. The following table shows the average number of children ever-born to parents of students in the University of California, classified according to education of the parents.

Data regarding size of families in a random sample of the population of Brooklyn, New York, were collected incidentally in a recent adult education study. The data were secured through interviews with employees in various

TABLE 119

AVERAGE NUMBER OF CHILDREN EVER-BORN TO PARENTS OF STUDENTS IN THE UNIVERSITY OF CALIFORNIA (1920–1924) CLASSIFIED ACCORDING TO EDUCATION OF THE PARENTS * [a]

Education of Mothers	Education of Fathers			
	Common School	High School	College	Total
Common school	4.17	3.89	3.44	4.03
High school	3.55	3.38	3.24	3.38
College	3.35	3.14	3.10	3.23
Total	3.94	3.46	3.27	

* Data by Holmes, 1924, as arranged by Banker, 1925, "Education and Fecundity," *The Journal of Heredity*, Vol. 16, pp. 57–59.

[a] More than 300 cases in all groups except the following:
Father common school, mother college, 98 cases;
Father high school, mother college, 187 cases;
Father college, mother common school, 163 cases.

industrial and commercial concerns, questionnaires circulated through adult education classes, women's clubs, a police organization, a teachers' organization, and through a house-to-house canvass in various sections, chiefly low-rent districts. Some figures showing number of children in relation to education were included in the original report. The original analysis was based on returns from all persons 31 years of age or over, and was therefore subject to bias by the inclusion of returns from young people attending evening classes. In order to eliminate this factor and in order to provide somewhat more detailed analysis, the original data have been reworked, limiting the material to returns from married persons, male or female, aged 41 years or over. The results of this detailed analysis are shown in Table 120.[15]

These results, in general, agree with the usual findings of a negative relationship between educational progress and fertility. The numbers are small, but the differences are large in most cases, and the variations present a consistent pattern. These data have the advantage of being based on a random sample of the population of a metropolitan area. It is interesting to find that continued interest in education, as represented by attendance at evening courses by married persons over 40 years of age, is strongly associated with small families. This is true when foreign-speaking persons who have attended classes in English are left out of the comparison altogether and, again, when foreign-born adults who had not attended classes in the English language are compared with foreign-born persons who have attended such classes. The specific association between adult education and low fer-

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[15] Lorimer, 1931, *The Making of Adult Minds in a Metropolitan Area*, pp. 162–165. The new analysis confirms the marked negative relationship between educational progress and number of children, suggested in the original study. It does not, however, show any significant relationship between size of family and answers to the questions regarding playing with children, or reading or telling stories to children, in the list of leisure-time activities.

TABLE 120

Numbers of Living Children Reported by Persons Interviewed in Brooklyn Adult Education Survey, According to Occupation, Education, and Leisure–Time Interests, Married Persons, Aged 41 or Over

No. of Cases	Description of Classes	Percentage of Persons of Each Class Reporting Specified Numbers of Children					Average Number of Children per Marriage
		0	*1–2*	*3–4–5*	*6 or Over*	*All Numbers*	
481	Total sample	16.6	37.6	35.3	10.4	100	2.6
	Occupations:						
46	Unskilled wage earners	4.3	34.8	50.0	10.9	100	3.3
89	Semi-skilled, and small shop keepers	7.9	28.1	46.1	17.9	100	3.4
84	Skilled wage earners	14.3	42.9	32.1	10.7	100	2.5
183	Business, clerical, and professional	21.3	40.9	31.7	6.0	100	2.2
79	Unknown, retired, etc.	25.3	36.7	26.6	11.4	100	2.5
	School attendance:						
267	Grammar school only; no adult course [a]	11.2	29.9	44.6	14.2	100	3.1
60	Grammar school only; adult course [a]	26.6	45.0	23.3	5.0	100	2.0
48	High school only; no adult course [a]	10.4	47.9	33.3	8.3	100	2.5
37	High school only; adult course [a]	24.3	45.9	24.3	5.4	100	1.8
69	College, one year or more	28.9	49.3	17.4	4.3	100	1.7
	Theater attendance:						
73	Checking motion pictures only	10.9	34.2	35.6	19.2	100	3.2
112	Checking vaudeville or musical shows	17.1	33.3	39.6	9.9	100	2.6
183	Checking drama or concerts	20.7	39.8	31.6	8.1	100	2.3
113	No answer	13.3	40.7	37.1	8.8	100	2.6
	Foreign language and study of English:						
105	Foreign born of non-English countries who have attended classes in English	8.6	40.0	39.0	12.4	100	3.1
109	Foreign born of non-English countries who have not attended such classes	5.5	28.4	45.0	21.1	100	3.7
214	Foreign born of non-English countries—total	7.0	34.1	42.0	16.8	100	3.4
	Reading habits:						
54	Native language English; reporting use of one of selected list, "high-brow" periodicals [b]	31.5	44.3	22.2	1.9	100	1.7
148	Native language English; reporting use of one of selected list, N.Y.C. newspapers [c]	29.7	37.2	29.1	3.9	100	1.8
130	Native language English; checking history, science, or politics in list of reading interests	22.3	40.0	31.5	6.2	100	2.2
267	Native language English—total	24.3	40.5	30.0	5.2	100	2.1

[a] Exclusive of courses in English for foreign-born.

[b] Magazines mentioned on questionnaires which were included in this list run as follows: *Atlantic Monthly, American Mercury, Century, Current History, Forum, Golden Book, Harpers, Nation, New Republic, Outlook, Review of Reviews, Scribner's, Survey Graphic, World's Work, World Tomorrow,* and all recognized scientific or critical reviews, but not including trade or religious journals.

[c] *Herald-Tribune, Post, Telegram, Sun, Times,* and *World.*

tility, suggested by the Brooklyn data, may be attributed in part to a greater expansion of leisure-time activities by those with small families, in part to the economic and social strain of persons who are ambitious to rise to a social status much higher than that in which they were born.

It is interesting to find that among men listed in *Who's Who in America* there is no consistent relationship between educational opportunity and fertility. The lowest marriage rates for this selected group are found in two sub-groups with limited educational background, (1) a small number who never had any formal instruction outside the home and (2) those who report professional training but do not report previous college experience. The highest frequencies of childlessness appear in a small group of normal school graduates and again in the small home study group (but both of these appearances may be due to chance deviations). The smallest families per man with children are found among (1) the Ph.D.'s, (2) those with only high school training, and (3) those with professional training but no college experience—whereas the highest average number of children per father appears in the large group of men who had the advantage of both college and professional school training. These data strongly suggest that among a group with similar standards of living, economic strain and struggle for occupational advancement tend to depress natality rates, more than do mere length or degree of educational experience.

TABLE 121

Family Records of Men Listed in "Who's Who in America, 1926–1927," Classified According to Education *

Kind of Education (Most Advanced Course)	Per Cent Who Report Themselves as Married	Per Cent of Married Who Do Not Report Children	Number Reported as Married with Children	Number of Children Reported	Average Number of Children per Person Reporting Children
Home study only	80.6	26.5	114	332	2.91
Public school	88.1	23.2	587	1,664	2.83
High school	88.8	18.5	900	2,412	2.68
Business or trade school	96.1	20.5	120	326	2.72
Normal school	95.6	30.4	64	194	3.03
Professional school (no college reported)	82.4	23.2	1,543	4,171	2.70
College	90.0	14.7	3,267	9,040	2.76
College and professional school	89.8	18.3	4,468	13,315	2.98
College and Ph.D.	91.7	13.1	2,704	7,129	2.66
Total, including unknown	87.3	17.6	13,843	38,792	2.80

* Based on data presented by Huntington and Whitney, 1927, *The Builders of America*, p. 338. The figures in the last three columns are given as reported by Huntington and Whitney. The figures in the first two columns are re-computed from adjusted values. The adjusted figures, which are not reported here, are based on the assumption that 10 per cent of those who did not report themselves as married actually were married and that 50 per cent of those who did not report children actually had children.

In studying the fertility of college graduates, it is important to analyze the influence of two distinct variables:

(1) marriage frequencies of college graduates, by sex, and

(2) fertility of marriages, as indicated by average number of children ever-born to surviving couples.

Representative data for college graduates, showing the influence of these two variables, are presented in Tables 122 and 123. The percentages shown here refer to numbers of living graduates for whom records were available.[16] The results of other studies are, in general, in agreement with these data.

We may now draw some general conclusions about the fertility of college graduates, using the basic data presented in the two following tables, with supplementary references.

1. Married women who are college graduates have apparently about as many children on the average as married college men or others with similar social status and similar interests. This result is illustrated in striking fashion in the recent data for a coeducational college (Swarthmore)—where the average number of children per married graduate appears to be exactly the same for alumni and for alumnae.

This conclusion is confirmed by an analysis of statistics for college and non-college married women (sisters, cousins nearest in age, and friends of

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[16] The following sources are used in these tables:

U. S. Bureau of the Census, *Fifteenth Census of the United States, Population*, Vol. 2, pp. 844, 856.

Huntington, Ellsworth, and Whitney, Leon T., 1927, *The Builders of America*, p. 338: Marital records and children of persons in *Who's Who in America, 1926–1927*, arranged by education. These authors estimate that 10 per cent of persons failing to report marriage actually had been married. However, we present here the unadjusted percentages, based on actual figures as reported without attempting an exact estimate of degree of error. (The percentage for men who are college graduates is the weighted average of percentages for "college," "college and professional school," "college and Ph.D." The percentage for women refers only to the "college" group, exclusive of graduates of professional schools for whom the reported frequencies are lower. College women listed in *Who's Who* cannot, of course, be regarded as a random sample of all college women but probably include a larger proportion of the unmarried graduates.)

Huntington, Ellsworth, Letter, December 12, 1933. Unpublished data for Yale classes.

Robinson, Caroline H., 1932, *Co-educational Graduates' Birth-Rates.* Paper presented at the Third International Congress of Eugenics, supplemented by unpublished data for Swarthmore classes.

Barnard College, 1930, *Register of Associate Alumnae*, pp. 203–212.

Johnson, Roswell H., 1929, "Marriage and Birth Rates at Bryn Mawr," *Eugenics*, 2, No. 9, p. 30.

Hartson, Louis D., 1928, "Marriage Statistics for Oberlin Alumnae," *J. of Heredity*, 19, 225–228.

Lasker, Helen, Murray, Caroline, and Maxwell, Jane, 1931, "The Smith College Alumnae Census of 1931," *The Smith Alumnae Quarterly*, 30, 408–412.

Newcomer, Mabel, and Gibson, Evelyn S., 1924, "Vital Statistics from Vassar College," *American J. of Sociology*, 29, 430–442.

Newcomer, Mabel, 1931, "Marriages and Children of Vassar College Alumnae," *Vassar Quarterly*, 16, 98–101. (Correction by Newcomer. Letter, December 16, 1933.)

Phillips, John C., 1927, "Success and the Birth Rate," *Harvard Graduates' Magazine*, 35, 565–570.

Sydenstricker, Edgar, and Notestein, Frank W., 1930, "Differential Fertility according to Social Class," *J. of the American Statistical Assn.*, 25, 25.

Notestein, Frank W., 1931, "The Decrease in Size of Families from 1890 to 1910," *Quarterly Bulletin of the Milbank Memorial Fund*, 9, No. 4, p. 184.

TABLE 122

MARRIAGE FREQUENCIES IN THE POPULATION AT LARGE AND AMONG COLLEGE GRADUATES

Population	Number of Records	Per Cent Ever-Married	Per Cent Married and Not Widowed or Divorced
Total United States, 1930			
Men, aged 45–49		88.1	82.1
Women, aged 40–44		90.5	80.6
Native whites of native parentage, Middle Atlantic Division, 1930			
Men, aged 45–49		87.0	81.5
Women, aged 40–44		86.0	77.7
Surviving college graduates, Men			
Listed in *Who's Who in America, 1926–1927*	6,187	90.3	
Swarthmore classes 1896–1912, recorded in 1930	303	88.4	
Harvard classes, 1899–1901 (25th class book)	1,899	81.1	
Yale classes, 1893, 1896, 1897 (25th class book)	692	82.4	
Surviving college graduates, Women			
Listed in *Who's Who in America, 1926–1927*	492	50.0	
Barnard classes, 1902–1906 (in 1930)	311	56.3	
Bryn Mawr classes, 1902–1907 (in 1929)		54.8	
Oberlin classes in 1907–1916 (in 1927)	988	56.0	
Smith classes, 1904–1908 (in 1930)		65.0	
Swarthmore classes, 1896–1912 (in 1930)	392	65.3	
Vassar classes, 1867–1871 (in 1919)	84	61.9	
" " 1872–1876 " "	151	55.6	
" " 1877–1881 " "	153	52.9	
" " 1882–1886 " "	132	59.1	
" " 1887–1891 " "	169	53.3	
" " 1892–1896 " "	331	53.2	
" " 1897–1901 " "	492	58.7	
" " 1902–1906 (in 1929)	850	63.6	
" " 1907–1911 " "	895	70.5	
" " 1912–1916 " "	951	72.5+	

the college graduates), conducted in 1900 by Mary Roberts Smith. She found that the 343 married college graduates reported 549 living children—an average of 1.65 children per married woman; and that the 313 non-college women reported 582 living children—an average of 1.87 children per married woman. Smith shows, however, that this difference may be attributed wholly to one factor, age at marriage. The college group were found to have married two years later, on the average, than the non-college group; 42 per cent of the married college women were over 27 years of age when they married, in contrast to 23 per cent of the non-college women. This factor alone accounts for the somewhat higher frequency of childlessness in the college group and the somewhat smaller average number of children per mother. In fact, Smith shows that the birth rate per year of married life during the childbearing period is actually higher for the college than for the non-college group. Similar results are indicated in a recent study along

TABLE 123

FERTILITY OF MARRIAGES OF COLLEGE GRADUATES

Population	Per Cent of Marriages Childless	Children per Marriage	Per Cent of Living Graduates Ever-Married	Children per Capita
Men, college graduates				
Swarthmore classes, 1896–1912 (in 1930)	21	2.15	88.4	1.9
Harvard classes, 1899–1901 (25th class book)	25	1.9	81.1	1.6
Yale classes, 1893, 1896, 1897 (25th class book)	25	1.9	82.4	1.5
Professional workers, Milbank sample, native whites of native parentage, Northern United States, 1910, wives aged 40–44	20	2.1 [a]		
Women, college graduates				
Swarthmore classes, 1896–1912 (in 1930)	18	2.15	65.3	1.4
Vassar classes, 1867–1871 (in 1919)	19	2.4	61.9	1.5
" " 1872–1876 " "	25	2.4	55.6	1.3
" " 1877–1881 " "	32	1.9	52.9	1.0 [b]
" " 1882–1886 " "	23	2.0	59.1	1.2 [b]
" " 1887–1891 " "	22	2.0	53.3	1.0 [b]
" " 1892–1896 " "	24	1.9	53.2	1.0
" " 1897–1901 " "	20	2.0	58.7	1.2
" " 1902–1906 (in 1929)	20	2.1	63.6	1.3
" " 1907–1911 " "	22	2.2	70.5	1.5
Estimated replacement values [c]				
Children per surviving woman at death rates:				
United States whites, 1919–1920				2.55
New Zealand, 1925–1928				2.31

[a] The Milbank sample is limited to cases of husbands and wives both living and not separated. No data regarding education are available for this sample, but it is assumed that men classed as professional workers are predominantly college graduates.

[b] Corrected figures. Authorized in letter from authors of original report.

[c] *See* Table 101.

similar lines, reported by Goodsell. The difference in average age at marriage between the college and the non-college group in this case is 1.31 years, and the difference in average number of children per married woman is 0.13—the college group being older at marriage and reporting slightly fewer children.

2. There is, nevertheless, a large difference in fertility between men who are college graduates and women who are college graduates. This again is strikingly illustrated by the Swarthmore data. Although the average number of children per married alumna is the same, in this sample, as the average number of children per married alumnus, there is an average of 1.89 children per man (alumnus) but only 1.41 children per woman (alumna)—due to the fact that nearly 90 per cent of the men had married, but less than 70 per cent of the women.

Among men who are college graduates and listed in *Who's Who in America, 1926–1927* and among men who are Swarthmore graduates, described above, the proportion who are married is somewhat higher than in the total native white male population in the United States at corresponding ages. But among men who are graduates of Harvard or Yale the proportion who are married seems to be definitely below the average for the whole population, according to records in the 25th Class Yearbooks. Apparently the proportions of men who eventually marry are about the same in collegiate and non-collegiate groups.

On the other hand, relatively low marriage frequencies are universally reported as characteristic of college women as a class. The percentage of college women who never marry ranges in reliable studies from 50 per cent or less to about 75 per cent. The marriage frequencies for Southern college women are apparently somewhat higher, but not very much higher than for Northern college women. Harper, 1930, reports proportions married within ten years after graduation for three Southern institutions as follows: Georgia State College for Women (formerly Georgia Normal and Industrial College), about 60 per cent; graduates of Florida State College for Women, about 55 per cent; graduates of Agnes Scott College (Georgia), about 70 per cent.

3. In so far as married women who are college graduates may have somewhat fewer children than their married non-college friends and relatives, this may be attributed to the influence of advanced age at marriage among college women. This has already been suggested in the studies by Smith and Goodsell.

The relation of fertility to age at marriage in the case of college graduates is exhibited in the following table. The numbers used are small, but the results are in general agreement with the results of other similar studies.

TABLE 124

Children per Marriage, Reported by Married Graduates of a Coeducational College, Classified According to Age at Marriage. (Completed Families) *

Age at Marriage	Men			Women		
	Number of Cases	*Per Cent Childless*	*Average Number of Children per Married Alumnus*	*Number of Cases*	*Per Cent Childless*	*Average Number of Children per Married Alumna*
20–22	34	15	2.6	52	12	2.9
25–29	134	16	2.3	136	11	2.2
30–34	74	20	2.1	50	26	1.7
35–44	26	50	1.1	29	59	0.6
45 or over	8	75	0.2	2	100	0.0
All ages	276	22	2.1	269	20	2.0

* Unpublished data, collected 1931 by Robinson.

4. A very considerable change is apparently taking place in the direction of increased fertility among women who are college graduates. A trend

toward more frequent marriages among college women during recent years is apparent in the statistics shown above for Vassar classes. This trend is shown more clearly, and is carried down to more recent years by a detailed comparison of two sets of statistics, collected in 1919 and in 1929. It should be noted that only the first two lines refer to women who have completed, or nearly completed, the childbearing period. It is clear that somewhat larger proportions are now marrying within a few years after graduation. A similar trend toward earlier and more frequent marriages among Smith College alumnae is shown in Figure 54.

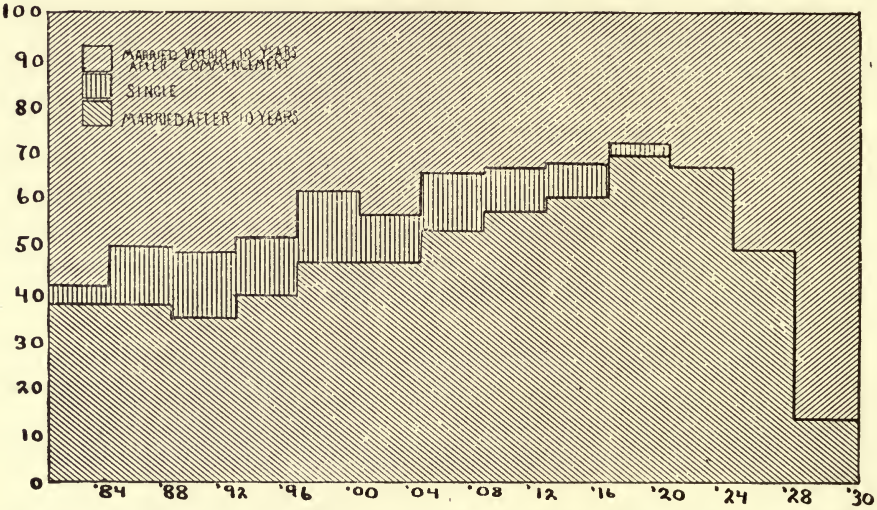

FIG. 54. PERCENTAGE OF SMITH COLLEGE ALUMNAE MARRIED, BY YEAR OF GRADUATION. From Lasker, Murray, and Maxwell, 1931, "The Smith College Alumnae Census of 1931," *The Smith Alumnae Quarterly*, Vol. 30, p. 412.

TABLE 125

PER CENT OF VASSAR ALUMNAE ANSWERING SCHEDULES IN 1919 AND IN 1929 WHO ARE REPORTED AS MARRIED—CLASSIFIED ACCORDING TO INTERVAL BETWEEN GRADUATION AND REPORT *

Years between Graduation and Report	1919			1929			Ratio of Percentage Married in 1929 to Percentage Married in 1919 for Each Interval
	Classes Represented	*Number Answering Schedules*	*Per Cent Married*	*Classes Represented*	*Number Answering Schedules*	*Per Cent Married*	
27–23	1892–1896	331	53.2	1902–1906	850	63.6	120
22–18	1897–1901	492	58.7	1907–1911	895	70.5	120
17–13	1902–1906	782	59.5	1912–1916	951	72.5	122
12–8	1907–1911	1,016	61.4	1917–1921	1,003	69.3	113
7–3	1912–1916	1,114	46.6	1922–1926	1,037	56.6	121

* From Newcomer, 1931, "Marriages and Children of Vassar College Alumnae," *Vassar Quarterly*, 16, 98–101.

In the case of college women the trend toward early marriage does not seem to be associated with avoidance of childbearing by young wives. The data already presented show an increasing number of children per married graduate among Vassar alumnae after a low point in the fertility record reached by classes graduating in the Nineties. Similar results are also reported by Johnson for Bryn Mawr alumnae.

TABLE 126

PER CENT OF BRYN MAWR GRADUATES, CLASSES 1890–1923, MARRIED WITHIN FIVE YEARS AFTER GRADUATION WITH AVERAGE NUMBER OF CHILDREN BORNE BY SUCH GRADUATES, IN CLASSES WITH COMPLETED FAMILIES *

Classes	Per Cent Married within Five Years after Graduation	Children per Alumna Married within Five Years after Graduation
1890–1895	21.9	2.15
1896–1901	20.3	2.43
1902–1907	27.0	2.57
1908–1913	31.8	—
1914–1919	37.3	—
1920–1923	41.0	—

* From Johnson, 1929, "Marriage and Birth Rates at Bryn Mawr," *Eugenics*, Vol. 9, p. 30. Based on *Register of Alumnae* for 1929.

Nevertheless, in spite of the recent tendency to earlier and more marriages among college women, advanced education still probably tends somewhat to delay, if not to hinder marriage. Thus, only 40 per cent of the most recent Bryn Mawr graduates described by Johnson were married at about 27 years of age, in contrast to 67 per cent among all native white women of native parentage at this age living in Philadelphia (1930 census data).

It has frequently been suggested that marriage frequencies are higher among the graduates of coeducational institutions, but the evidence supporting this idea is not conclusive.

We may conclude that, except for the higher frequencies of celibacy and of late marriage among women pursuing advanced education, higher education as such does not exert any depressing effect on fertility. And a trend toward earlier and more frequent marriages is definitely indicated at present. How far this trend will carry remains to be seen.

9. *Conclusions*

The spread of the family limitation pattern through different sections of American life, with varied effects at different times and under different conditions, has been the main current in the vital changes which we have reviewed. The prime sources of this movement have been a rise in standards of living and the development and diffusion of new attitudes toward all human affairs and particularly toward reproduction. This current has run most rapidly through urban centers, especially in circles with advanced education. In rural areas its course has been checked by the conservatism and relative isolation of most rural families. Family limitation practices are now just beginning to reach some of the most isolated parts of the country, notably, communities in the Southern Appalachian area. This movement was also retarded among immigrant groups, so long as they remained under the influence of the traditions and customs of the peasant communities from which they were largely recruited. But as these immigrant stocks have adopted American urban ways of living, their birth rates have dropped with astonishing rapidity. It is, therefore, clearly apparent that the very large variations in fertility now found among American groups are in part the expression of an incomplete social process, which has perhaps run its full course in some sections of our population, but not in others. We may, therefore, confidently expect that present group differentials in reproduction rates will be considerably modified in the course of the next generation or so, through the further spontaneous diffusion of family limitation practices among groups which have as yet been relatively less affected by this process.

In part, however, differential reproduction rates appear to be controlled by conditions that are not likely soon to disappear, such as differences in age at marriage and frequency of marriage, in standards of living, in ideals, and in personal factors which affect resort to and efficacy in attempts at birth control. Differences in standards of living involve differences in the costs of childbearing and child nurture, ranging from the situation of some farm families where children are an economic asset to the situation of some professional families where the expected expenditure for the care and education of each child amounts to a large part of the expected income of the whole family. Differences in standards of living also involve differences in length of training and apprenticeship, ranging from the situation of many unskilled workers who may reach full earning power at twenty to the situation of many business and professional workers who must spend half of the reproductive period in formal preparation for later undertakings or in activities for which they are at first paid little but are given promise of future advancement.

Attitudes favorable to large families are likely to develop in a fertile population; and attitudes favorable to stringent family limitation are apt to develop in a relatively infertile society. Thus, attitudes and practices tend to reinforce each other in complex social patterns, which are both an expression and a cause of the habits of individuals.

We have found that no groups with a high standard of living and with a knowledge of birth control methods can be expected to be permanently self-replacing unless influenced by social conditions that are distinctly favorable to fertility. The two major motives tending to lower fertility in such groups seem to be anxiety about health and economic pressure, especially during the early years of married life. We also found that higher education is still associated, among women though not among men, with delayed marriage and with lower than average marriage rates; but among married women we found no apparent difference in fertility between college graduates and others of similar social status, if the factor of age at marriage is held constant. There is a well-marked negative association between full-time gainful occupations for women and fertility; this relationship involves problems for which no wholly satisfactory solution is apparent.

The well-educated urban groups in American society have been characterized by a drift toward patterns of living which are incompatible with permanent family replacement. Any general change in this tendency will necessarily be a very slow process. It will involve the gradual building up of attitudes favorable to reasonably high fertility, with preference for families of three, four, five, or more children, and the development of social institutions and ways of living which will provide the physical vigor and the economic security essential for the support of such families.

CHAPTER XIII

POSSIBILITIES OF SOCIAL CONTROL

It has not been the purpose of this book to define a population policy for the United States or propose a program of practical eugenic activity. We shall be satisfied if we have presented a fair picture of the changes which are taking place in our population, of their causes and of their social consequences. But the problems raised are so new as subjects of serious study, that the question is still constantly asked, "Are the forces that determine population change in any way subject to social control?" as though we were dealing with something mysterious or outside the realm of reasonable social concern. It is our belief that the causes of population change are just as capable of being placed under social control as are the forces influencing health, economic processes, or other human activities. This belief can perhaps best be justified by considering some of the social conditions directly related to changes in our population and the extent to which they might be modified.

1. *Conditions of Rural Living*

Recent efforts directed toward establishing a limited, prosperous American agricultural community take on new significance when viewed in relation to population trends in this country. Rural communities will constitute for an indefinite period the principal source of future population increase in the United States. In determining the conditions of rural living we are thus determining the conditions of the main stream of "immigrants" who will replenish the population of other sections. In the absence of an intelligent and vigorous public policy this main source of future population supply might easily drift into the condition of an impoverished peasantry, sending out migrants ill equipped for life in more progressive communities. It is likely that in the past the demographic influence of a neglected peasantry may have played a large rôle in undermining great commercial nations. On the other hand, the development of conditions of rural life such that farming communities will attract and hold energetic and intelligent young people, with attractive opportunities for work and a fair sense of economic security, would undoubtedly have a profoundly beneficial effect on future population trends in this country.

From this standpoint it is important that programs for agriculture should include in their scope the whole agricultural population of the nation, and not merely those sections where standards of living are already fairly high. We have seen (Chapter IV) that a rise in level of living, after a certain minimum has been attained, does not seem to involve any change in rural birth rates, so that a general increase in farm incomes is not incompatible with the maintenance of rural reproduction at a point well above replacement. A moderate rural-urban differential in fertility is thus likely to remain with improved farm conditions, which may have a healthy influence in offsetting low birth rates in urban districts. On the other hand, if declining fertility in other regions were to be balanced by excessive fertility in retarded rural groups, it would tend to cause further economic imbalance and to retard cultural-intellectual advance, even though such groups, in some cases at least, may be biologically as well equipped as any in this country. We must then be prepared to accept some lowering of birth rates, incidental to the raising of standards of living in rural areas which are now underdeveloped, even though this may place an added burden on other groups for balancing births and deaths in the maintenance of a desirable national population. Raising of standards of living among retarded rural groups will involve outside support in the promotion of education, health facilities, and better economic institutions. In some cases it may involve moving all or part of the population now living in areas with very limited natural resources into other regions.

Rural prosperity in many ways depends upon an established industrial prosperity. The maintenance of a more stable national economy is probably, for this and other reasons, one of the essential conditions of wholesome trends in reproduction. But industrial recovery will not necessarily insure agricultural prosperity. And in this section we have dealt with standards of rural living, because of their special demographic significance.

2. *Slum Clearance and City Planning*

The policies suggested for the rural population are aimed at an improvement of the educational and cultural background of the most rapidly growing group in our population. The differentials within urban areas are not so great as the rural-urban differential, but they may be of even greater importance because of their biological significance, evidence of which we have noted in Chapter X. A change in urban class differentials can only be effected by a change in attitudes, but it is probable that physical conditions of city life are closely related to the attitudes of different classes in the population. Bad housing and a depressed environment appear always to be accompanied by high fertility. And in turn the large families of wage earners with low incomes or irregular employment result in still lower levels of living. Some types of extreme social disorganization, involving vagabondage, prostitution, and disease, tend to reduce fertility; but, in general, high birth rates appear to be typical of the poorest quarters in most American, as well as in most French and English cities. We do not yet clearly understand the causes responsible for the association of slums and excessive fertility, but it appears significant that the European cities in which the expected social class differentials in fertility have disappeared, or have been reversed, e.g., Stockholm, Berlin, and some other German cities, are cities in which slums have been largely eradicated.[1]

While unhealthy crowding in slum areas seems to raise fertility, the concentration of city populations in apartment houses and typically urban surroundings appears to be associated with extreme family limitation. Proper city planning to provide attractive residential districts and moderately priced suburban homes, and superior rapid transit facilities, would appear a necessary step in attempting to modify those social attitudes which are responsible for extreme family limitation in all but the lowest economic groups in our modern cities.

It would thus seem likely that urban developments which assure decent environment and attractive housing for all classes would tend both to counteract forces conducive to high fertility among families least equipped for this responsibility, and to give some impetus towards an increase of births among those most interested in providing superior conditions for family living, and who are also, as we have previously noted, probably superior on the average in biological capacity for intelligence.

3. *Conditions Affecting Marriage*

There are tremendous differences in the frequency of marriage, especially among women in different social groups. Thus, in some of the older college alumnae groups 50 per cent are spinsters, and according to more recent statistics some 20 to 25 per cent of college alumnae are likely to be spinsters at forty years of age, in contrast to about 10 per cent in the general population. The proportion of women aged 20–44 years reported as ever-married varies considerably in different states, with an average of about 75 per cent for all urban groups and about 83 per cent for all rural groups. Obviously such variations, which have a profound effect on fertility rates, are controlled by particular attitudes and social conditions. And these attitudes and conditions are conceivably subject to some degree of public control.

Residential propinquity has been shown to be an important factor in marriage selection (Bossard, 1932). Particular social institutions also definitely affect marriage opportunities and marriage frequencies (Popenoe, 1932). There might well be more study of the significance in this respect of various social agencies. The development of more adequate opportunities for normal association between young men and women in work and in play, aside from occasional parties in a highly artificial atmosphere, might be a factor toward earlier marriage in many groups. It would also provide more adequate selection of marriage partners, as well as supplying the foundations of coöperative enterprise, understanding, and mutual appreciation which are the foundation of happy family life. This suggestion carries many obvious implications about social institutions which need not be developed here at length.

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[1] These tentative conclusions are based largely on the data presented for different European cities by von Ungern-Sternberg. There are various statistical hazards in all these studies of birth rates by urban districts; and contrary results are sometimes reported by different investigators. The data for Stockholm and for Berlin have been worked up very carefully by Edin and by Freudenberg, respectively (*see* Bibliog. IV).

The normal time for the beginning of childbearing is somewhere in the vicinity of twenty years of age. There are three reasons for this: The proportional frequency of sterile marriages and marriages of limited fecundity apparently increases with each advancing year of wife's age at marriage, after full maturity in the late 'teens, gradually until about 28 or 30 years of age, and rapidly thereafter; the proportional frequency of puerperal maternal mortality is lowest in the vicinity of twenty years of age; and the postponement of childbearing to late ages sometimes results in the formation of life habits which are more or less incompatible with the care of children. There are social obstacles in the way of early marriages. It is sometimes felt that people are unable to choose life partners wisely while they are still young because their interests are undeveloped. But granted strong personal responsiveness and fair equality in intellectual abilities between young partners, interests may be expected to develop mutually. Personalities grow within a happy marriage as well as in the celibate state. It is possible that earlier marriages than the average might result in somewhat more frequent divorces. But this perhaps would involve less maladjustment than the suppressions or illicit unions resulting from prolonged celibacy after full physiological maturity. The chief reason for delayed marriages is probably the financial insecurity of young people, and the inability or unwillingness of parents to extend financial security to their married sons and daughters. In social classes in which advanced education is emphasized, this enforced delay of marriage is greatly intensified.

The combination of early marriages and the financial security of young couples must constitute the foundation of any practical program of "positive eugenics." It is not at all inconceivable that social patterns more favorable to this combination may be established.

4. *The Adjustment of Women's Activities to Maternity, with Special Reference to Gainful Occupations*

At all social levels gainful full-time occupation of women seems to be negatively associated with size of family. This is due in part to the circumstance that women who, for any reason, are childless or have few children are more apt to seek employment than mothers with large families. But there is good reason to believe that the causal influence works both ways. Few women deliberately choose to remain childless for the sake of professional advancement. The developmental sequence is more frequently somewhat as follows: (1) The woman with occupational interests may refuse opportunities for marriage which do not conform to her ideal pattern, with the idea that at least she will have her work to fall back on. The marriage pattern itself may be complicated by the condition that the prospective husband be favorable to her occupational interests. The result may be that she will remain unmarried, or may marry only at an advanced age,—the proportional frequency of celibacy at 35 years of age among women appears to be more than three times as high among college graduates as in the general population. (2) If married, the woman with occupational interests may delay initial conception or prolong intervals between births, beyond the spacing desired merely for health reasons, in order to complete pre-vocational studies, or because of the pressure of particular situations in her work. (3) Even though originally the partners in such a marriage may have planned to have a family that would be "normal" from the demographic standpoint (i.e., with three or more children in fertile marriages), the strain on the wife's health and resources of full-time work, home responsibilities, and social engagements, may be such that the family will abandon the idea of further increases after one or two children are born. Some women are apparently able to combine successful professional careers with home responsibilities and large families, but such women are at present about as rare as those who deliberately renounce parenthood altogether.

There are various reasons in favor of industrial, business, and professional activities for married women. The removal of gainful activities from the household through specialization of labor has greatly lessened the significance of the household as a production unit. The business man's wife today does not share management and labor with her husband as did the farmer's wife under more primitive conditions. Even if the urban wife spends as many hours in housework, home management, and social responsibilities, as the wife in an agricultural society, she may nevertheless be conscious of a difference in the responsibilities and opportunities afforded by her tasks and those of her husband. At the same time, the modern woman has come to have new respect for her own personality, and feels ready to take an increased share in the risks, responsibilities, and enjoyments of life. The responsibilities involved in child care have, in a sense, increased, due to the development of scientific procedure. But the most burdensome of these responsibilities are concentrated within a limited period of life.

These considerations suggest that a very complex problem is encountered when the attitudes and interests of the educated, modern woman and eugenic values are both taken fully into account. It is possible that more extensive provision of nursery schools and other community services for children may somewhat alleviate the situation. General provisions for maternity leave might also be of some aid. On the other hand, it may be that for most women consecutive, full-time, paid occupations are incompatible with the most complete realization of the values of family life.

More extensive research on this subject is desirable. In the meantime, it would seem advisable that in educational courses for women greater stress should be placed on interests which are obviously compatible with maternity rather than on pre-vocational studies leading toward professional activities which may be more or less incompatible with family values. The gainful occupation of married women, however, is not by any means purely a cultural affair. In many families it is chiefly a matter of bridging the gap between income and standard of living. Thus we are thrown back again to the problem of the economic security of young families, which is essential to normal family development.

5. *Conditions Affecting the Economic Security of Young Couples*

The establishment of a fair degree of economic security for young couples who seek to plan their affairs in accordance with definite standards or ideals would seem to be a basic condition of "birth release" among such couples and the normal development of family life. Young couples interested in advanced education are apt to wait until they are reasonably sure that they can pay for adequate hospital care nine months later and tuition fees eighteen years later, before they allow the first conception to occur. And similar considerations will affect the way in which they build up their families.

The American tradition of expecting young people to "start at the bottom and work up," struggling along during the first ten years of married life in order eventually to achieve a complaisant maturity, is about the most vicious cultural pattern, from the standpoint of eugenics, which has ever been developed. The idea, for example, that a brilliant medical student should be expected to scrape and borrow his way through the university, devote a dozen years to building up a practice, and finally "arrive" at about forty or fifty years of age at a position of eminence suggests a very efficient sterilizing process. It may be added that such students frequently receive "subsistence" fellowships, sometimes on the explicit condition that they remain unmarried. The statement of this condition, however, is generally being abandoned as superfluous in academic procedure. A very similar situation confronts the ambitious young man who enters business.

The promotion of economic security during the reproductive period for all classes, and especially for young intellectual workers, may be effected by various changes, including (1) the practice of parental endowment at marriage, analogous to the old dowry system but not limited to one side of the family; (2) liberal fellowships for advanced students of superior ability with automatic adjustment to size of family; (3) equal pay for equal work at different ages; (4) long-term appointments; and (5) employment insurance. In return, productive workers may be expected to participate in the support of aged persons, either individually or collectively.

Beyond such measures, which are concerned with the proportional distribution of income at different periods in the life cycle, lie the larger problems of the stabilization of the whole economic system and the achievement of more general economic security. Eugenic arguments against general economic depressions, like eugenic arguments against war, are undoubtedly sound. But there is perhaps little to be gained by laboring these arguments.

The coming of international peace or the stabilization of business conditions, if not achieved for other reasons are not likely to be established for their eugenic values.

6. *Conditions Affecting Contraception and Sterilization*

Populations with no family limitation or populations with free access to contraceptive information have apparently, as might be expected, less extreme class differences in reproduction rates than populations in which some groups have access to scientific guidance in this matter and other groups do not to the same extent. The American people are, at present, in this situation. There appear to be wide variations between different groups and different social classes in knowledge and in practice of contraceptive technique. Groups with inferior education and inferior economic status, in so far as they attempt contraception, tend to rely chiefly on practices which may be personally most objectionable and therefore apt to be neglected, or which are more or less ineffective. Studies of applicants to birth control clinics in various countries show that these applicants are generally recruited in large part from the families most in need of such advice, from the social as well as from the individual standpoint.

The provision of contraceptive services under competent administration on such a liberal basis that these services would be equally available to all social classes would, therefore, seem to be an important item in an adequate social eugenics program. The extension of such services into backward rural areas will require special attention.

Modern surgical sterilization does not involve any interference with sexual activity, as regards its personal values. Vasectomy in males is a minor operation, apparently without serious physical consequences—except absolute contraception. Salpingectomy in females is a more serious abdominal operation. This operation is roughly comparable, as regards fatality or sequelae, to appendectomy or to parturition. Sterilization is now being effectively applied to handicapped persons, such as mentally defective and mentally diseased persons, who come temporarily under institutional control but are to be paroled or discharged—usually with the consent of the individuals concerned if legally competent, or with the consent of their guardians. The feasibility of this procedure has been demonstrated in California (*see* reports by Gosney and Popenoe). Its legality has been tested in the Supreme Court. Social workers are, in general, favorable. This procedure is therefore gradually being extended. Sterilization laws are now on the statute books of more than half of the states in the United States.

Legal enactment and institutional procedure can hardly be expected to reach more than a small proportion of the families most likely to become progenitors of mentally deficient or maladjusted children—bearing in mind the significance of genotypic variations from phenotypic types, and the fact that the extreme deviates are less likely to be highly fertile than their normal or nearly normal relatives. On the other hand, these families frequently fail to make effective use of present contraceptive methods even when they are freely available, and sometimes even after professional instruction. The limitations of legal sterilization, on the one hand, and of ordinary contraceptive procedure on the other hand, make the treatment of the type of families that perhaps constitute the most serious dysgenic threat in our national life extremely difficult.

In German, Russian, and other European cities, and to some extent in this country, family limitation among these groups, where effective at present, is largely accomplished by resort to abortion. This procedure, however, is generally condemned both on moral and on hygienic grounds. The development of new types of contraceptive techniques, or more effective methods of applying present techniques, is essential to great advance in this field. Intensive research on this subject is very desirable.

It is possible that the voluntary extension of surgical sterilization is the most feasible procedure on the basis of our present knowledge. In three ways sterilization is an ideal technique: It is sure; it makes no demands on the intelligence or emotional control of the subject, beyond initial consent; and it involves no interference with sexual activity. In a sense it is the most aesthetic method yet devised. The two difficulties with this method are its cost, including professional services, loss of time, and personal risks, and the irreversibility of the usual procedure. In families who feel that they already have enough children the last item is not a serious obstacle. The financial cost of sterilization in the case of families likely to become dependent would obviously be far less to the state than the probable cost of providing indefinitely for their offspring. It is likely that a suggestion that all possibility of further family increase could be eliminated by a single operation, without financial cost to the individual, and without any interference with sexual habits, might be welcomed by many families where such action might be very desirable socially.

It seems reasonable that social agencies should recommend cessation of childbearing after the birth of the second living child in the case of families that are personally handicapped or partially dependent on public or institutional aid for their maintenance. From the merely economic standpoint, the placing of additional burden either on the community or on the handicapped families themselves may be seriously questioned—provided that social workers are prepared to enable dependent families to effect such limitation. The chance that such a family would be totally bereft by such a course is not unduly high.[2] The present writers believe that eugenic considerations strongly reinforce the economic considerations in favor of such recommendation.

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[2] In the white population of Pittsburgh, 1919–1920, about nine-tenths of all two-year-old children were expected to live to twenty-two years of age (*United States Abridged Life Tables, 1919–1920*). And about three-fourths of all children born were expected to live to twenty-two years of age. At these rates, if childbearing ended after the birth of the second living child, we should expect that in 67.5 per cent of the families both children would reach maturity, and that in another 30 per cent of the families one child would reach maturity, so that only one couple in 40 would be left absolutely childless.

7. *Conditions Affecting Immigration*

Ideally, immigration policies should be developed with reference to the characteristics of individuals and their near-kin. Politically, it is frequently necessary to deal with groups. It can be shown that there are significant differences in the distribution of intellectual development among immigrants to the United States from different nations. The results of tests recently administered in their native language to applicants for immigrant visas at different consular offices in Europe show this conclusively. It would appear, on the basis of these findings, that the quota system has tended to result in a distribution of initial intellectual development among immigrants somewhat superior to that which would have been characteristic of unrestricted immigration—although there are some important exceptions to this general tendency as regards particular national or religious groups. This represents an economic and cultural, and possibly a genetic, benefit to this nation.

There would seem to be every reason in favor of extension of the quota principle of immigration control to North America (especially south of the Rio Grande), South America, and the Atlantic and Pacific Islands. The Mexican scholar, Manuel Gamio, in a study sponsored by the Social Science Research Council, recommends a clear distinction between permanent and temporary (seasonal) migrations—favoring limitation of the former movement, but facilitation and regulation of the latter. He suggests that official Mexican coöperation could be secured in carrying out such a policy.

There has been a great influx of persons of diverse racial origin, with low standards of living and with unknown intellectual capacities during recent years, although this movement has been temporarily abated by the economic depression. These groups have also been characterized, at least during the first generation, by rapid natural increase. Combining immigration and natural increase, there was accession to the United States during the last decade of nearly a million persons of Mexican or West Indian origin, including large proportions of Indian and Negro stock. There seems to be no valid reason, except the private gain of some parties interested in exploiting cheap labor, for a continuance of this policy. The time would seem to be ripe for legislative action on the matter.

8. *Race Relations*

Our survey of psychological data has left us extremely skeptical of most current ideas on the subject of racial differences in hereditary capacities for intellectual development. On the other hand, certain differences which may have genetic significance must be taken into account. Among the descendants of various European nationalities, where no caste line is operative, the persistence of low social status in the second and third generations of American families may be indicative of inferior hereditary qualities. But in this case the problem may be simply translated into terms of the social class differential, and dealt with on that basis, without involving invidious racial distinction.

The situation is somewhat different with regard to more or less distinct races with separate cultural patterns, concentrated in particular localities, as in the case of Negroes, Mexicans, and Indians. Each of these ethnic groups includes a disproportionate number of persons of low apparent intellectual development; but in view of their economic and cultural background we do not know to what extent, if at all, these findings may indicate high frequency of hereditary incapacity. In the case of Negroes, it has been shown that families established in Northern cities appear to be distinctly superior to most Southern families of the same race, and to include many superior individuals. Superior intellectual capacities have also been demonstrated in many Mexicans and Indians.

In this situation it would seem wise, in developing eugenic policies, to begin with the recognition of individual, family, and group variations within each race. In view of the constant possibility of intermating between different groups living in proximity, the eugenist will be concerned about improving the quality of minority groups, as well as that of majority groups. Intelligent leaders of minority groups must share this objective. Their coöperation in the development of eugenic policies may, therefore, be expected and encouraged.

In the first place, the continuance of conditions of poverty and ignorance which prevent the normal development of innate capacities is intolerable. These conditions are all the more deplorable because families with low standards of living are apt to be unusually prolific, and thus heighten the national menace of poverty, ignorance, disease, and, in some instances, hereditary deficiency. We cannot afford to leave any group which has been adopted into the life of the nation in a state of ignorance.

In the case of colored families that respond well to opportunities for intellectual advance, the eugenic principles already outlined suggest attention to greater provision for the economic security of young couples, especially among intellectual workers. In the case of colored families that fail to respond to such opportunities, the sort of efforts already described as generally applicable to families of low intellectual development may be evoked—and similar difficulties must be faced.

It would seem very unfortunate for the most intellectual Negroes to be consistently attracted to relatively sterile urban living and for the most retarded Negro families, left in rural areas, to remain fairly prolific. Industrial demand for unskilled labor at low wages tends to counteract this tendency, in some cases taking the form of more or less wholesale recruiting, with company provisions for transportation. The encouragement of superior Negro families in rural communities, both in agricultural and in professional activities, might also afford a counteractive force in the other direction.

We have gone a long way toward producing a dependent Indian people. Some tribes, adjusted to such a dependent existence, are now showing a tendency toward high effective fertility, and are likely, if their situation remains unchanged, to become increasingly burdensome. But the Navajo, who have preserved greatest independence, are also characterized by high fertility. It seems highly desirable to encourage the development of self-respecting, healthy, representative Indian communities. Governmental efforts have recently turned in this direction.

The only contribution of scientific genetics to the problem of racial intermarriages is that, in view of the principle of phenotypic variance from genotypic qualities, attention must always be paid to the characteristics of near-kin as well as to individual development. In the case of individuals of equal capacities, with equally well-endowed near-kin, remote racial affiliation appears, on the basis of present evidence, to be of negligible importance. Unions, usually illicit, between persons of very different capacities, always involve hazards from the eugenic standpoint. Interracial unions of such a character carry an additional social stigma. The discouragement of sexual union marked by lack of mutual respect—which has been typical of a large proportion of the miscegenation in this country—is an eugenic objective which intelligent leaders of racial minorities will readily share with other thoughtful persons.

Students of all races may also coöperate in the scientific study of degrees of intellectual development and variations in genetic capacities in different groups.

9. *Social Attitudes*

We suggested in the conclusion to the previous chapter that attitudes favorable to large families are likely to develop in a fertile population, and attitudes favorable to restriction of families in a relatively infertile population. Attitudes are in part the expression of current practices; they also reflect new interests which may or may not become established in common behavior.

More than half of the American population, including most of those enjoying the greatest economic and educational advantages, have gradually drifted toward patterns of family life that are incompatible with permanent family replacement. A change in the attitudes associated with this tendency leading to a greater emphasis on the values of family life would therefore seem to be essential to the establishment of a stable and improving social order. This is a large task but, in our judgment, it has adequate warrant. And efforts directed toward such a change will find the support of powerful human motives, and if developed with some humor, toleration for individual deviations, and respect for other interests, may bring an increase rather than a diminution of immediate human happiness. The recent development of institutions and literature concerned with child life has undoubtedly tended toward making the rearing of children more attractive.

The change in attitudes which we are here envisaging, toward a greater emphasis on family values, is likely to be effected more by the sort of indirect changes already described than by direct attempts to change public attitudes. On the other hand, much could undoubtedly be done to make these ideals more explicit and more generally accepted. It would seem that the general education of both men and women might be advantageously modified in the direction of giving more consideration to the aims and values of life, particularly those values having to do with the family. The education of women may need to be more sharply differentiated from that of men, with greater attention in the case of women to development of interests that are not likely to be disrupted by marriage and maternity, and that are wholly compatible with effective family life. The education of men might also be changed so as to lead them to share more deeply the problems and experiences of family living.[3] New developments in adult education may open the way to extensive educational programs dealing with family life and eugenics.

10. *Conclusions*

To a surprising degree, the most effective means of modifying present differentials in fertility, so as to decrease the fertility of handicapped groups and to increase the fertility of families with superior resources, would seem to coincide with changes which are socially desirable for other reasons. This is not always the case, but it is usually so.

Those situations in which excessive fertility tends to destroy economic balance, to spread family traditions rooted in ignorance, or to have dysgenic effects are situations in which individuals find themselves unable to control their own destiny, baffled, and led to despair or indifference; whereas, a release of fertility among those who feel themselves able to control their own destiny is largely dependent on opportunities for earlier marriage, and greater economic security.

A tendency toward larger families would necessarily involve a greater emphasis on family values and less emphasis on a certain type of individualism. Such a change would bring an increase in happiness to many; but to some it may seem to involve restriction of personal freedom. Perhaps this dilemma cannot be altogether avoided; but it has been unnecessarily accentuated in eugenic literature. It seems worthwhile to lay stress chiefly on the large beneficial changes in population trends which may be effected by means which are in line with other important social objectives.

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[3] There is some evidence that men, being less appreciative of the values of family life, are more apt than women to insist on severe family limitation (*see*, for example, G. V. Hamilton, 1929, *A Research in Marriage*, p. 124).

CHAPTER XIV

CONCLUSIONS

We have found that the population of the United States as a whole is rapidly tending to become a stationary population. In fact, natural increase at the time of this writing is due wholly to temporary abnormalities in the distribution of the present population by age classes; if present fertility rates and present death rates at particular ages should remain absolutely constant, all natural increase would cease after a few decades. It is possible that cessation of growth will be followed by a period of slow population decrease, considered apart from possible effects of future migration. Present indications, however, do not point toward any rapid decrease. In recent years birth rates in some large sections of the population have tended toward stabilization near their present levels. Moreover, it is possible that before any considerable decrease actually appears in the total population of the United States, below a maximum to be expected sometime near the middle of this century, the gradual replacement of less fertile groups by more fertile groups within the national population may bring about a trend toward increased fertility. It is impossible to make reliable long-time pronouncements about the future total population of the United States. But there can be no doubt that the period of rapid natural increase is now coming to an end.

Within this total population, gradually approaching equilibrium, very diverse forces are at work. Some large groups are reproducing so rapidly and other large groups are so diminishing, that the surviving children of a million women of childbearing age now living in some groups will be twice as numerous as the surviving children of a million women in some other groups. Such an extreme differential, if continued for three generations, would cause the descendants of the first group to be sixteen times as numerous as the descendants of the second group. Much less extreme differentials can cause great population changes in a relatively brief period in the history of a nation. Thus, some groups are tending quite rapidly to replace other groups in our national life. And since these different groups play different rôles in a more or less balanced economic system, and have different cultural traditions, and in some instances have different hereditary characteristics, the sort of population changes that are now taking place carry large consequences for the future life of the nation.

We have sought to give as systematic an account as possible of the social consequences of population change in the United States, with reference to the measurable characteristics of various population groups. In our description of population trends we have drawn materials from many sources, and we are especially indebted to the studies of differential fertility among social groups by the staff of the Milbank Memorial Fund and to the studies by Thompson and Whelpton of the Scripps Foundation for Population Research, in association with the President's Research Committee on Recent Social Trends.

The rural-urban differential offers the most striking contrast in reproduction rates. We have estimated that in the five-year period preceding the last census the effective fertility of rural-farm women in the United States was sufficient to supply a natural increase of some 60 per cent per generation; that of rural-nonfarm women was supplying an increase about one-half as large; that of women in small cities and towns was just about adequate for replacement; but a reproductive loss of some 10 per cent per generation was indicated for cities of 25,000 to 250,000 inhabitants, and a loss of more than 20 per cent per generation for larger cities—limiting our comparison here to the white population, and using the expected ratios of women of childbearing age in two successive generations as an index of rate of reproduction per generation.[1] Rates for all these groups have dropped since the period 1925–1929, but their relative position has presumably not changed much.

The rural-urban differential in reproduction rates is a composite function, with two main factors: large variations between geographical regions, and differences in fertility between rural and urban communities in the same region.[2] The first of these factors is likely to be greatly modified in the next few decades, because birth rates, although still very high, are now falling rapidly in many sections of the South and in the Rocky Mountain states, which are predominantly rural regions. But the second of these factors, local variations within the same region, is dependent in large part on more or less permanent differences in ways of living between farm and city people. The rural-urban differential in fertility, which gradually widened through the whole Nineteenth Century, reached a maximum value in 1930; but if we limit the comparison to native white elements, this differential in fertility between farm and city groups was less in 1930 than in 1920, indicating an approachment which may be expected to continue for several generations. But although birth rates may be expected to drop more rapidly for a time in rural sections than in cities, we do not see any indication that the rural-urban differential in reproduction rates is likely to disappear, or to become negligible in the visible future.

Social classes differ in fertility almost as universally as do rural-urban groups, but usually in less extreme degree. When allowance is made for the influence of varying mortality rates on net reproduction, the variations observed are somewhat dampened but are not greatly changed in character. Using recent *Birth, Stillbirth and Infant Mortality Statistics for the Birth Registration Area of the United States*, we have estimated that mothers with husbands in the unskilled laboring group were having over 15 per cent more children than would suffice for family replacement, whereas mothers with husbands in the professional group were having only about 75 per cent of the number needed for family replacement. And we have noted, in a recent survey of health conditions in several large cities, that families with very low income or with unemployed workers consistently maintained a much higher birth rate during the depression years, 1929–1932, than families with higher incomes and constant employment. Clearly throughout the last few decades and during recent years, births have been most frequent among families with low economic status and least frequent among families with superior educational advantages and superior occupational ratings.

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[1] Fertility rates and death rates for women alone are used as a matter of statistical convenience. Variations among men in fertility, of course, affect these variations in rates for women. And there is no assumption that differences between women, either in physical conditions or in attitudes, have a greater influence on net reproduction rates than variations among men.

[2] Only variations in fertility need to be taken into account here, because we found that reproductive survival values (determined by age-specific death rates for infants, children, and young people) are apparently just about identical at present for rural and for urban groups.

On the other hand we do not find any important differences in reproduction tendency at the present time among large groups classified by race or by country of origin. The fertility of recent immigrant stocks in cities is higher at present than that of their neighbors of old native descent; but there has been a tremendous drop in the birth rates of the former groups since the World War, as they have become more adjusted to American ways of living. And, even now, in view of the concentration of these immigrant stocks in cities, the effective fertility of foreign-born women is just about equal to that of native women for the country as a whole, and the average fertility of all native women of foreign parentage is apparently less than that of all native women of native parentage. A reverse situation appears in comparing Negroes with whites. In this case the reproduction rate of the minority group was apparently below that of the majority group until recently; but the former rate has remained more constant than the latter, so that at present both the Negro group and the white group are about at equilibrium, as regards "true" reproduction rates.

Some of the small racial minorities, among whom the Mexicans are numerically most important, are now increasing with exceeding rapidity. It is quite likely that the present very high effective fertility of these minor racial groups may decline with continued residence in this country. However, the effective fertility of the Indians, which is also very high at present, has apparently been rising in recent years, perhaps due to an increase in the relative importance of tribes with both traditions and living conditions favorable to high fertility.

Turning from the mere description of the reproductive tendencies of different population groups to the study of social consequences, we have taken three kinds of effects into account:

1. Economic effects;
2. Effects on hereditary capacities;
3. Effects on social environment.

We have found the most conclusive evidence of broad tendencies of great social importance in the third of these items. But we have reached some fairly definite, though more limited, conclusions on each of the other counts.

The economic aspect of population change which has received most attention from theorists, stimulated by Malthus, is the relation of total population to total natural resources within national boundaries or economic areas. This interesting topic is at present of slight importance for Western European nations or the United States—except as regards attempts at the establishment of national self-sufficiency—for in all these nations population is approaching relative stabilization. And although conceivably a much higher level of living could be maintained in some cases with a larger, and in other cases with a smaller, population, no theoretical "optimum population" for any nation at any given stage of industrial development has ever yet been worked out.

In the judgment of the present writers the most serious economic aspect of present population trends in the United States is the accumulation of surplus population in agriculture areas with limited natural resources. This tends to create a serious imbalance in our whole economic structure. It also tends to prevent a rise in levels of living, including levels of education and health, in areas where the lowest general levels of living are now found. It is easy to dismiss this problem by saying that this surplus farm population, accumulating at present at the rate of 200,000 persons or more each year, can simply move out. But the difficulties and uncertainties of transfer to new localities and the handicaps experienced by newcomers entering city life from rural localities tend to check this movement, even in normal times. This check becomes a prohibitive barrier in periods of economic crisis and extensive industrial unemployment.

A somewhat analogous difficulty is presented by an increase in families with the background of unskilled laborers in a period when demand for manual workers is decreasing rather than expanding. It would seem probable that this tendency must have some effect in the direction of reducing the bargaining power and depressing the condition of manual workers. The low fertility of the professional and upper commercial groups is offset for the present by the educational stimulus of modern society which tends to produce an excess of candidates for professional and commercial positions with a constant accession of ambitious individuals from less well-educated groups. In any case, differentials in fertility among urban social groups presumably have far less immediate economic importance than differentials among regional groups and the present very large rural-urban differential.

From the standpoint of hereditary capacities, however, occupational status is the one basis of classifying population groups on which any controlled evidence of hereditary deviations has been found. There are as yet only a few studies bearing directly on this topic; but the results obtained from three studies which yield properly controlled data agree in indicating that from one-third to one-half of the variations usually found among occupational classes in average levels of cultural-intellectual development are due to deviations in hereditary capacities. The overlapping in capacity for intellectual development among children derived from different social groups must be even greater than the overlapping in apparent intelligence among adults in these groups, because of the environmental influence of different social situations on intellectual development, and because of variability in inheritance due to the operation of recessive genes. Some of the children of unskilled workers are, of course, superior in native endowment for intelligence to some of the children of college professors and business managers. This fact should always be stressed. Nevertheless, the best evidence now available indicates that the usual negative correlation between fertility and social status involves a gradual decline in average hereditary capacity for intellectual development. The force of this influence, though imperceptible, is by no means negligible. Such a tendency if continued for many generations would result in a serious lowering of capacity for cultural-intellectual progress by the American people. A subject of such grave importance certainly calls for more extensive investigation, but meantime we cannot neglect the consistent implications of the few controlled studies that have already been carried out.

There are no equally well-controlled data available for comparisons between different racial groups as regards hereditary factors for intelligence. The indirect evidence is sufficient to prove conclusively that the apparent differences in cultural-intellectual development between major racial groups are due in large part to environmental influences. Again the great overlapping of individual abilities in the case of all large groups needs to be stressed. But whether or not there is a residual difference in average capacity for intellectual development between any major groups in this country, classified by race or by country of origin, is a matter on which the available scientific data are still ambiguous and inconclusive. In any case, there seem to be no large differentials in reproduction rates among racial groups in this country at present, except in the case of some small groups.

There is perhaps even less evidence of any significant difference in hereditary capacities for intellectual development among large regional groups, or between farm people and city people in general.

We also have found that one must be extremely skeptical about apparent indications of hereditary differences in vitality (the hereditary capacity for health and longevity) between any large American groups, regional, racial, or social. There is clear evidence of the importance of genetic factors in causing variations among individuals in physical development and health. There are many variations among racial groups in specific factors affecting particular physical traits and, to a less degree, susceptibility to particular diseases. It is likely that some more or less isolated communities on the edge of progressive areas are characterized by a high frequency of various sorts of hereditary defects. But, so far as the writers can see, present knowledge about variations in physical development and health among large groups in the United States and about the causes of these variations does not give any clear implications for population policy. The amelioration of conditions unfavorable to physical development and health is dependent wholly on the intelligent coöperation of communities and families and on economic resources. Problems relating to the economic requirements of health are beginning to receive the large attention which they obviously demand. The more elusive but not less important problems relating to the cultural-intellectual level needed for effective progress in public health activities have been more neglected; advance in this field, as in all democratic processes, is fundamentally conditioned by the prevailing level of cultural-intellectual development in the society concerned. In considering the relation of differential reproduction rates to social environment, we have therefore concentrated our attention on their effects on cultural-intellectual levels.

In general, it is evident that those who enjoy the greatest cultural resources are not having enough children to replace themselves in the next generation, and that the most undeveloped groups in our national life are the chief sources of population increase. Moderately high reproduction rates are found in agricultural areas with high indices of cultural-intellectual development, but the population included in such areas is certainly less than half of the total farm population of the nation. And, with the exception of a few sparsely populated states in the Rocky Mountain division, the states with conspicuously high reproduction rates are also characterized by very low ratings on indices of cultural-intellectual level. Giving attention to variations in effective fertility within states, we also found that, below a certain level of farm income or farm values, effective fertility rises with further decline in level of living—as evidenced by data for Illinois, North Carolina, Alabama, and Oklahoma. We found no evidence of variations in effective fertility among rural Negroes in counties classified by average value of farms operated by Negroes; but the reproduction rate for rural Negroes is now about as high as the reproduction rate for rural whites, and shows less tendency toward decline. Thus, each new generation of Americans is tending to be disproportionately recruited from areas with low standards of living and inferior educational resources. The constant stream of migrants to urban areas from marginal mountain and coastal areas in the North, from the Southern Appalachian area, and from marginal cotton lands, enforced by current reproduction trends, is steadily working to counteract the educational efforts now being made in American cities. Such a finding at once suggests doubts about the validity of the doctrine that each state has a right to determine its own economic and educational standards, and that the nation as a whole has no responsibility for such conditions—assuming that there is to be free intermigration between states.

In the same way, but to a less degree, the cities and metropolitan centers of the United States show a differential rate of reproduction as between broad occupational classes, often as between specific occupational groups within these broad classes and, with minor exceptions, the higher rate of reproduction is found quite universally in the group with the lower educational and social background. These findings are confirmed by studies on the birth rate of urban families classified by intelligence ratings, the least intelligent families having on the average the largest number of children, and the families with the high ratings the fewest. Here, however, there appears a more hopeful aspect, in that there is quite a little evidence that among certain very limited groups with high educational background and unusual economic security, the rate of reproduction may be equal to requirements for replacement. It is to be hoped that such a trend exists and is increasing, for the present urban differentials not only tend to counteract the improvements in educational and social standards which would otherwise result from the educational facilities of our cities, but there is strong evidence that they have a positively dysgenic aspect, lowering in each generation the average hereditary capacity for intelligence of our people. Present reproduction tendencies seem to be having especially serious effects at both extremes of the scale of intellectual development, tending disproportionately to reduce the number of individuals with unusual ability to be expected from any given number of births, and significantly to increase the proportion of individuals of low-grade intelligence.

Our vast educational program may perhaps be sufficient to outweigh the depressing effects of present population trends in their purely environmental aspects. It can never make up for the dying out of any large proportion of people with superior capacities for education. Two mass tendencies are apparently moving in direct opposition: the conscious force of educational endeavor, and the blind influence of present population drift.

Thus many of the present varying rates of reproduction of American groups are bad from the economic, the cultural, or the eugenic point of view. There is, however, an encouraging indication that present differences in reproduction rates are in part the expression of an incomplete social process; some of the most extreme differentials in fertility among American groups are likely to disappear as current changes in attitudes and behavior, already established in a large portion of the population, spread to more isolated, less privileged, and less developed groups. The more permanent factors tending to cause differentials in fertility among American groups are also predominantly social factors, and therefore they are subject to control.[3]

The first step in social control is critical analysis of what is actually taking place. Vital statistics have been developed with increasing refinement for several centuries, and important advances have been made recently in developing methods for studying the reproduction trends both of national aggregates and of various types of population groups. But demographers have often presented their analysis of population changes without any systematic attempt to determine the causes of these changes or to trace their social consequences. At this critical point they have usually fallen back on purely subjective impressions and speculative interpretations. Others have approached population problems with various special interests, such as local pride in "population gains," or fear that people whom they happen to dislike may be increasing, or an anxiety to find evidence on various topics, including birth control, in support of convictions that have their real basis in humanitarian sympathy, liberal impulses, or loyalty to moral or religious systems. Meanwhile, governments launch programs for the support of particular groups and for the development of new areas involving large population changes, with little systematic investigation of their ultimate effects.

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[3] At several points we have suggested that much light could be thrown on the nature of differential fertility by an extensive investigation of social conditions in communities where the usual social class differential in fertility is not found (as in several European, and presumably in some American cities), in comparison with social conditions in communities where this differential has continued with little modification in recent years.

Perhaps the most striking result of this investigation has been its revelation of the dynamic character of present population changes in the United States, and a sense of the complexity and weight of the social consequences resulting from these changes. Present population trends are tending to create a serious economic imbalance between agriculture and industry, and perhaps between some other groups in our economic structure. There is an apparent very gradual but by no means negligible drift toward undermining our most precious inheritance, the capacity for high intelligence. Very certainly there is a strong force at work that runs exactly counter in its effects on social environment to our conscious educational efforts. And yet this whole set of forces, perhaps second in social importance only to the need for a more stable and equitable economic order, has remained largely neglected by social scientists.

There is a tremendous need for more extensive and systematic investigation of population in its dynamic aspects, with reference both to the consequences of population trends and to the social conditions which determine these trends. There is need for further controlled research on the social and genetic characteristics of particular groups, on the relation of the distribution of population by region and by type of community to reproduction trends, and on the social factors which cause variations in fertility among different groups. Population studies of this sort clearly transcend the old distinction between quantitative and qualitative studies. The analysis of population changes in relation to their social effects and in relation to their causes and control really constitutes a single field of study.[4]

Possibilities of the social control of reproduction trends have been discussed in some detail in the preceding chapter. In one sense the problems involved in the so-called "negative" aspects of population control are simpler than the problems involved in its "positive" aspects. The former movement merely calls for the hastening and extension in particular groups of processes already at work in the general population. Such efforts are also generally in line with a humanitarian interest in raising the economic and educational levels of handicapped groups, and they can enlist the powerful support of material self-interest.

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[4] This field may be briefly characterized as "Social demography."

In the positive aspects of population change we are brought face to face with more subtle problems of values and attitudes, and here a reversal of some popular tendencies seems to be demanded. We have seen that in American cities among the most privileged groups and among the large middle classes (including skilled craftsmen and commercial and technical workers) there has been a strong drift toward patterns of family living that are incompatible with permanent family replacement. Clearly one of the essential conditions of a stable and improving social order must be the development of patterns favorable to voluntary family replacement or natural increase among those who are able to control their own destinies to a high degree. We have seen that this must involve a widespread preference for families with three, four, five, or more children. Such a development will involve social and educational changes tending to give greater emphasis to values of family life, to ways of living which promote physical vigor, and to conditions which guarantee a larger measure of economic security, especially to young couples during the early reproductive years. Because such a development involves some of the most profound and emotional aspects of human life, it is important that public policies in line with this objective should be framed with scrupulous scientific caution and with respect for the spontaneity and variety of individual interests.

Population trends have run their course in the past with little attention by anyone to their momentous influence on human destiny. Variations in fertility, although immediately controlled by individuals, are indirectly determined by particular social factors. It is evident that the social conditions which affect reproduction might be modified in a number of ways, so that the dynamic influences of population change would be more in line with conscious social objectives. Eventually, if our dream of human progress is to be realized, rational social action must replace the operation of blind forces in this as in other fields. In the furtherance of this ideal there is need both for more exact science and for a larger appreciation of the possibilities and values of human life.

APPENDICES

APPENDICES

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APPENDIX A

NOTES ON THE MEASUREMENT OF REPRODUCTION TRENDS

The most exact method of obtaining *true rates of natural increase per year* has been set forth by Dublin and Lotka, 1925.[1] Unfortunately, the application of the Dublin-Lotka method is expensive; moreover, proper data of the requisite kinds are lacking for many groups. Fortunately, however, there are several alternative methods of obtaining approximate reproduction rates by procedures that are free from gross disturbance by abnormalities of age or sex distribution. Furthermore, reproduction rates *per generation* are satisfactory for estimating large differences in reproductive tendency between groups. Annual rates have the added refinement of taking into account variations in mean length of (female) generation.[2] Among groups with very similar reproduction rates per generation, large differences in average ages of mothers at confinement may exercise considerable influence on long-term population trends. But among groups with quite different reproduction rates per generation, variations in mean length of generation are relatively unimportant in determining reproduction differentials.

The calculation of a reproduction rate per generation is, in any case, the first step in a calculation by the Dublin-Lotka method of a true reproduction rate per year.[3] The procedure is a straightforward one, if adequate data are available. Record is made of the average number of daughters born alive per female at successive ages during the childbearing period. The sum of these maternal frequencies (daughters only), at specified ages, gives the average number of female infants expected per lifetime per woman who lives through the whole reproductive period. This sum is called the *gross reproduction rate* (*per generation*). Life-table values give the proportions of female infants born alive who may be expected to reach successive ages in a given population. By applying the proportion of females born alive that may be expected to survive to each age during the childbearing period to the maternal frequency (daughters only) at that age, and taking the sum of such products, one finds the number of infant daughters expected in the next generation per female infant born alive at any time—on the hypothesis that the age-specific rates remain in force indefinitely. This value is the *net reproduction rate* (*per generation*). The ratio of the latter rate to the former rate may be called the *reproduction-survival ratio*. It represents the proportion of the potential reproductive force of any group that survives the decimating effects of mortality.[4]

Approximate reproduction rates per generation can be derived from other types of data on fertility, which are more generally available than age-specific fertility rates and frequently less subject to error, in combination with appropriate life-table values. The types of fertility data which are most useful for this purpose are as follows:

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[1] The mathematical foundations of this method are based on prior researches by Lotka (1907), Sharpe and Lotka (1911), and Bortkiewicz (1911); *see* Bibliog. I.

[2] The mean length of maternal generation for whites in 1920 was 28.33 years, as estimated by Dublin and Lotka. It has apparently changed very little since that time. The mean length of maternal generation for Negroes in five Southern states, also for Negroes in fourteen Northern states, is estimated by Holmes and Parker as 27.5 years, for 1919–1920.

[3] This part of the Dublin-Lotka method was developed independently in the Berlin statistical office by Boeckh in 1886, and has been applied extensively by Kuczynski.

[4] The process described here is illustrated, with recent life-table data for New Zealand, in Appendix V.

(1) "General fertility rates," e.g., births per 1,000 women of childbearing ages, usually taken as 15–44 years;

(2) Ratios of children under 5 per 1,000 women (or per 1,000 married women) of childbearing ages (e.g., 15–44 years, or 20–44 years); and

(3) Records or estimates of numbers of children ever-born (and in some cases numbers of children surviving) per 1,000 women, or per 1,000 married couples, or per 1,000 mothers of completed fertility.

Each of these types of fertility data can be combined with appropriate life-table values for similar populations, so as to supply approximate reproduction rates per generation. The basic procedure is essentially identical in all three cases. An estimate is made of the number of births, or number of children of specified ages, that would be just sufficient under specified conditions to supply a parental group in the next generation equivalent, as regards potentiality for parenthood, to the parental group from which the births, or children, in the sample under observation were obtained. In this way a *replacement quota* is obtained.[5] Different kinds of replacement quotas correspond to different types of fertility data. The ratio of actual births, or children, in the sample to the appropriate replacement quota gives a net reproduction rate per generation. For example, if a certain group of adults would on the average under observed conditions be replaced in equal numbers by the survivors among 100 infants, and if it were found that this group of adults actually brought to birth 110 infants, we could say that this group was characterized by a reproduction rate of 1.10 per generation, or a rate of natural increase of *plus* ten per cent (+.1) per generation.

The replacement quota corresponding to a *general fertility rate* (e.g., births per 1,000 women aged 15–44 years) can be read off directly from life-table values, by taking the ratio of hypothetical births per year to the number of females of specified ages in the life-table population[6] (*see* Table 1).

TABLE 1

REPLACEMENT QUOTAS CORRESPONDING TO GENERAL FERTILITY RATES *

At Mortality Conditions and Sex Ratio at Birth of Specified Populations	Births per Year per 1,000 Women Aged 15–44 Years Sufficient to Maintain a Stationary Population
Aggregate white, U. S. birth registration states, 1919–1920 (106 males/100 females)	84.4
Negro, 7 Southern states, 1919–1920 (102.7 males/100 females)	98.3
Aggregate white, U. S. birth registration states, 1930 (106 males/100 females)	78.0
Ideal population, with no deaths between birth and end of the reproductive period. (Assuming 106 males/100 females.)	68.7

* *See* Appendix B.

The relatively narrow range of these replacement values (that for Southern Negroes. 1919–1920, being only 30 per cent above the absolute lower limit) may be contrasted with the wide variability of actual birth frequencies per 1,000 women aged 15–44, as shown in the following table:[7]

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[5] Such an estimate is sometimes called a "permanent replacement quota," to distinguish it from quotas indicating the number of births or number of children that would replace persons dying at crude death rates, as affected by the "temporary" or "abnormal" age and sex composition of the population.

[6] *See also* Appendix B.

TABLE 2

OBSERVED GENERAL FERTILITY RATES *

Areas	Births per 1,000 Native White Women Aged 15–44 (Standardized Rates)	
	1918–1921	*1928–1929*
Massachusetts, Connecticut, and New York	70	64
Five Southern states	122	98
Utah	139	112
Washington, Oregon, and California	71	59

* Abstracted from Whelpton, 1932, p. 860 (*see* Bibliog. I).

A reproduction index based on *ratios of children to women* is used extensively in this text, especially in the measurement of the reproduction trends of regional groups. An index of this sort is obtained by finding the relation of an observed number of children under five years per thousand women of specified ages in any group to an appropriate replacement quota. This replacement quota may be read off directly from an appropriate life table, being the ratio of children under five years per thousand women of specified ages in the corresponding stationary (life-table) population (*see* Appendix B). The advantages of this index are as follows:

(1) The requisite fertility data are available for a great variety of groups;

(2) The procedure is free from a statistical bias affecting estimates based on birth registration data, caused by allocation to urban areas of births to rural women confined in city hospitals;

TABLE 3

VARIATIONS IN APPARENT REPRODUCTION RATES PER GENERATION OBTAINED BY COMPARING OBSERVED RATIOS OF CHILDREN TO WOMEN AMONG WHITES IN FOUR SELECTED AREAS, 1920, WITH CORRESPONDING QUOTAS FOR (A) IDENTICAL POPULATIONS, (B) TOTAL REGISTRATION AREA AT THE SAME DATE, AND (C) TOTAL REGISTRATION AREA TEN YEARS LATER

Selected Areas	Children under 5 per 1,000 Women Aged 20–44 Years, 1920	Replacement Quotas for the Same Areas[a]	Reproduction Rates per Generation			Series B as per Cent of Series A	Series C as per Cent of Series A
			With Quotas for the Same Areas (Series A)	*With Quota for Total White Pop., 1919–1920 (Series B)*[a]	*With Quota for Total White Pop., 1930 (Series C)*[b]		
Kansas	589	466	1.264	1.248	1.330	98.7	105.2
Kentucky	722	483	1.495	1.523	1.630	110.2	109.0
Washington, D.C.	260	457	.569	.551	.587	96.8	103.2
Pittsburgh, Pa.	517	491	1.053	1.095	1.167	104.0	110.9

[a] Based on *U. S. Abridged Life Tables, 1919–1920.*

[b] Based on life tables prepared by the Statistical Bureau, Metropolitan Life Insurance Company.

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[7] The corresponding replacement quota for Negroes in Northern states in 1919–1920 would be somewhat higher; but the quota for either Northern or Southern Negroes in 1930 would be well below the value for 1919–1920, shown here.

(3) The errors arising from under-enumeration of children, although serious, are not greater than the errors caused by under-registration of births, and in some cases the former type of error can be more accurately estimated from supplementary data;

(4) Little error is possible from inaccurate data on variations in infant mortality, because such variations are in large part automatically eliminated from both sets of data used in this procedure;

(5) The dependence on appropriate life-table values is thereby reduced, so that the reproduction index is usually changed by a relatively small percentage by the use of a replacement quota derived from somewhat inappropriate life-table values (*see* Table 3 on page 353. *See also* Chapter 1, Figure 5).

It should be noted that the number of children under five years at any time reflects the fertility of the parental population during the preceding five years, as modified by infant and child mortality. We use the term "effective fertility" to designate the tendency measured by a ratio of children to women. Thus the number of white children under five years per thousand white women aged 20–44 years in the United States in 1930 is said to measure the effective fertility of the white population of the United States during the period, 1925–1929. By the use of figures for numbers of women aged 20–44 years, the influence of variations in the number of females at ages when comparatively few are mothers of small children is largely eliminated, but an adequate base is provided. The age period 15–44 years is frequently used but is somewhat more subject to the statistical disturbance just mentioned, without compensating advantage.[8, 9]

In using ratios of children to women, the possible influences of under-enumeration of children must always be taken into account. This influence can be gauged with reasonable accuracy in some cases. Table 4 supplies "adjustment ratios" for this influence for the native white and for the Negro population of the United States for census data of 1920. We may assume that the adjustment ratio thus obtained for native whites in 1920 is applicable to total whites in 1930. It is, however, quite possible, in view of the better enumeration of Negroes in the last census, that an adjustment ratio intermediate between that for Negroes in 1920 (1.156) and that for whites in 1920 (1.045), namely, about 1.10, would afford a more accurate basis for adjusting 1930 values for Negroes than a procedure on the assumption that the relative under-enumeration of Negro children in 1930 was the same as in 1920. It should also be noted that we have no means of knowing how true adjustment ratios would vary in different types of communities.

It is possible to estimate *family replacement quotas* for specified groups (e.g., the number of children needed to replace one woman, or one wife, or one mother in the next generation under specified conditions) by using age-specific fertility-survival schedules. The inverse of the "reproduction survival ratio" (described above) gives the number of female infants that must be born alive to produce one woman with average opportunity for childbearing as regards survival. If the replacement quota is to be used with reference to numbers of children reported by women who have completed the childbearing period, a further adjustment is needed.[10] A series of such replacement quotas is presented in Chapter X, and the detailed data on which they are based are given in Appendix W.

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[8] The age distribution of mothers aged 15–44 years, with children under five years, in the total United States, in 1930, is estimated to run as follows:

About 4.0 per cent of such mothers were aged 15–19 years;
about 23.4 per cent of such mothers were aged 20–24 years;
about 28.6 per cent of such mothers were aged 25–29 years;
about 21.8 per cent of such mothers were aged 30–34 years;
about 14.7 per cent of such mothers were aged 35–39 years;
about 7.6 per cent of such mothers were aged 40–44 years.

This estimate is based on the age distribution of mothers in the year 1928.

[9] Ratios of children under 5 per 1,000 women aged 15–44 years frequently appear in our text. Some of these ratios are taken from other writers. Some were calculated by the present writers before the usage here recommended was adopted.

[10] The replacement value for *one female of average expectation of fertility* (the reciprocal of the

A procedure for estimating net reproduction rates for occupational classes, from birth registration data, is described in Appendix I.

TABLE 4

Relation of Number of Persons Enumerated as 10–14 Years in 1930 to Number of Persons Enumerated as 0–4 Years in 1920, Compared with Expected Ratios at Specified Life-Table Values, for Native Whites and for Negroes

Classes	Expectation at 1919–1920 Death Rates [a]	Expectation at 1930 Death Rates [b]	Expectation for Period 1920–1930 (Mean of Values for 1919–1920 and 1930)	Observed Ratio of Persons Aged 10–14 in 1930 to Persons Aged 0–4 in 1920	Ratio of Estimated Number of Children under 5 in 1920 to Number Enumerated
Native white males	.948	.972	.960	1.005	1.047
Native white females	.956	.976	.966	1.008	1.043
Adjustment ratio for whites					1.045
Negro males	.925 [c]	—	.942 [d]	1.096	1.163
Negro females	.934 [c]	—	.952 [d]	1.093	1.148
Adjustment ratio for Negroes					1.156

[a] Based on *United States Abridged Life Tables, 1919–1920.*

[b] Based on life tables prepared by the Statistical Bureau of the Metropolitan Life Insurance Company.

[c] For Negroes in 5 Southern states.

[d] The proportion of non-survivors among Negroes of each sex is reduced from the 1919–1920 value by a percentage equal to that for the white population, on an assumption of equal percentage decreases in death rates for whites and for Negroes during period in question.

reproduction survival ratio) may be interpreted as representing the proportion of female infants born alive who will reach an age, to be called the *fertility survival center,* such that the number of infants previously borne by women who die at just this age would normally be equal to the number of births that will be lost by deaths of potential mothers at later ages. The needed correction for *completed fertility* is given by the sum of the differences between the reproductive survival ratio and specific survival values to later ages multiplied by the corresponding maternal frequencies (daughters only) at different ages, this *sum* being expressed in ratio to the gross reproduction rate per generation. *See* Appendix W, Table 2.

APPENDIX B

EXHIBIT OF STATIONARY POPULATION VALUES FOR WHITES, UNITED STATES, 1919–1920, 1930, AND NEGROES IN SEVEN SOUTHERN STATES, 1919–1920, AND FOR AN IDEAL POPULATION WITH NO DEATHS BETWEEN BIRTH AND COMPLETION OF REPRODUCTIVE PERIOD—PER 100,000 FEMALES BORN ALIVE PER YEAR

	White, 1919–1920. Sex Ratio at Birth, 106 Males per 100 Females [a]	Negroes in 7 Southern States, 1919–1920. Sex Ratio at Birth, 102.7 Males per 100 Females [a]	White, 1930. Sex Ratio at Birth, 106 Males per 100 Females [b]	Ideal Population, if Sex Ratio at Birth Were 106 Males to 100 Females
Males, all ages				
a. If sex ratio were 100/100	5,532,945	4,638,868	5,947,405	
b. At observed sex ratio	5,864,926	4,764,117	6,304,249	
Females, all ages	5,751,820	4,545,778	6,305,763	
Total, all ages	11,616,746	9,309,895	12,610,012	
Males, under 5				
a. If sex ratio were 100/100	455,286	444,702	466,203	500,000
b. At observed sex ratio	482,603	456,709	494,175	530,000
Females, under 5	462,917	450,900	472,842	500,000
Children, under 5	945,520	907,609	967,017	1,030,000
Females, 15–19	436,929	406,237	458,654	500,000
" 20–24	427,422	383,443	452,820	500,000
" 25–29	414,975	357,572	445,530	500,000
" 30–34	401,274	330,612	437,582	500,000
" 35–39	387,311	304,359	428,608	500,000
" 40–44	373,344	278,582	417,705	500,000
" 20–44	2,004,326	1,654,568	2,182,245	2,500,000
" 15–44	2,441,255	2,060,805	2,640,899	3,000,000
Ratios:				
Females 15–44 per total population	.21015	.22136	.20943	
Females 15–44 per females 20–44	1.218	1.246	1.210	1.200
Children under 5 per 1,000 females, 15–44	387	440	366	343
Children under 5 per 1,000 females, 20–44	472	548	443	412
Expectation of life at birth in years ($\overset{\circ}{e}_0$)	56.39	45.93	61.21	

EXHIBIT OF STATIONARY POPULATION VALUES, ETC.—*Cont'd*

	White, 1919–1920. Sex Ratio at Birth, 106 Males per 100 Females[a]	Negroes in 7 Southern States, 1919–1920. Sex Ratio at Birth, 102.7 Males per 100 Females[a]	White, 1930. Sex Ratio at Birth, 106 Males per 100 Females[b]	Ideal Population, if Sex Ratio at Birth Were 106 Males to 100 Females
Birth rates:				
Births per year per 1,000 population	17.7	21.8	16.3	
Births per year per 1,000 women, 15–44	84.4	98.3	78.0	68.7

[a] Based on *United States Abridged Life Tables, 1919–1920* (by Foudray) and unpublished data supplied by Foudray.

[b] Based on life tables prepared by the Statistical Bureau of the Metropolitan Life Insurance Company. Stationary population under one year (L_{0-1}) is taken as $.283l_0+.717l_1$ for males, and $.298l_0+.702l_1$ for females. These values give true L_{0-1} for original Registration States, 1910. True weights for 1930 would depart somewhat further from mean. At other ages $L_{x-(x+1)}$ is taken as $.5l_x+.5l_{x+1}$.

APPENDIX C

EFFECTIVE FERTILITY AND NET REPRODUCTION RATES OF NATIVE WHITES BY DIVISIONS AND BY STATES. DATA OF 1920 AND 1930

Area	Children under 5 with Native White Mothers per 1,000 Native White Women Aged 20–44 Years			Index of Net Reproduction per Generation (1.00 = Trend toward Stationary Population)		
	Data of 1920 [a] (*a*)	*Data of 1930* [b] (*b*)	*Value for 1930 as per Cent of Value for 1920* (*b/a*)	*Data of 1920* [c] *(Permanent Replacement Ratio: 472)* (*c*)	*Data of 1930* [d] *(Permanent Replacement Ratio: 443)* (*d*)	*Value for 1930 as per Cent of Value for 1920* (*d/c*)
United States	538	479	89	1.14	1.08	95
New England	393	407	104	.83	.92	110
Maine	515	539	105	1.09	1.22	112
New Hampshire	435	463	106	.92	1.04	113
Vermont	525	539	103	1.11	1.22	109
Massachusetts	359	374	105	.76	.84	112
Rhode Island	363	393	108	.77	.89	115
Connecticut	371	374	101	.79	.84	107
Middle Atlantic	429	403	94	.91	.91	100
New York	362	351	97	.77	.79	104
New Jersey	402	372	93	.85	.84	99
Pennsylvania	512	478	93	1.08	1.08	100
East North Central	493	452	92	1.04	1.02	97
Ohio	482	446	93	1.02	1.01	99
Indiana	519	483	93	1.10	1.09	99
Illinois	450	395	88	.95	.89	94
Michigan	524	505	96	1.11	1.14	103
Wisconsin	548	502	92	1.16	1.13	97
West North Central	554	488	88	1.17	1.10	94
Minnesota	538	477	89	1.14	1.08	95
Iowa	546	491	90	1.16	1.11	96
Missouri	510	445	87	1.08	1.00	93
North Dakota	722	634	88	1.53	1.43	94
South Dakota	670	573	86	1.42	1.29	91
Nebraska	578	506	88	1.22	1.14	93
Kansas	574	498	87	1.22	1.12	92

EFFECTIVE FERTILITY AND NET REPRODUCTION RATES OF NATIVE WHITES—*Continued*

Area	Children under 5 with Native White Mothers per 1,000 Native White Women Aged 20–44 Years			Index of Net Reproduction per Generation (1.00 = Trend toward Stationary Population)		
	Data of 1920[a] (*a*)	*Data of 1930*[b] (*b*)	*Value for 1930 as per Cent of Value for 1920* (*b*/*a*)	*Data of 1920*[c] (*Permanent Replacement Ratio: 472*) (*c*)	*Data of 1930*[d] (*Permanent Replacement Ratio: 443*) (*d*)	*Value for 1930 as per Cent of Value for 1920* (*d*/*c*)
South Atlantic	713	596	84	1.51	1.34	89
Delaware	491	421	86	1.04	.95	91
Maryland	507	453	89	1.07	1.02	95
District of Columbia	240	262	109	.51	.59	116
Virginia	688	594	86	1.46	1.34	92
West Virginia	788	712	90	1.67	1.61	96
North Carolina	827	694	84	1.75	1.57	90
South Carolina	777	648	83	1.65	1.46	89
Georgia	731	598	82	1.55	1.35	87
Florida	627	520	83	1.33	1.17	88
East South Central	734	656	89	1.56	1.48	95
Kentucky	722	674	94	1.53	1.52	100
Tennessee	706	615	87	1.50	1.39	93
Alabama	786	682	87	1.67	1.54	92
Mississippi	740	659	89	1.57	1.49	95
West South Central	682	566	83	1.44	1.28	88
Arkansas	798	672	84	1.69	1.52	90
Louisiana	659	583	89	1.40	1.32	94
Oklahoma	722	599	83	1.53	1.35	88
Texas	630	514	82	1.33	1.16	87
Mountain	631	550	87	1.34	1.24	93
Montana	620	514	83	1.31	1.16	88
Idaho	729	619	85	1.54	1.40	90
Wyoming	593	534	90	1.26	1.21	96
Colorado	516	465	90	1.09	1.05	96
New Mexico	757	688	91	1.60	1.55	97
Arizona	580	472	81	1.23	1.07	87
Utah	788	677	86	1.67	1.53	92
Nevada	447	423	95	.95	.95	90
Pacific	388	331	85	.82	.75	91
Washington	462	388	84	.98	.88	89
Oregon	463	383	83	.98	.86	88
California	341	305	89	.72	.69	95

[a] Ratios by Thompson, *Ratio of Children to Women, 1920*, pp. 200–201.

[b] Based on census data.

[c] Permanent replacement quota based on *United States Abridged Life Tables, 1919–1920* (*see* Appendix B).

[d] Permanent replacement quota based on life tables prepared by the Statistical Bureau, The Metropolitan Life Insurance Company (*see* Appendix B).

APPENDIX D

REGISTERED BIRTHS PER THOUSAND NATIVE WHITE WOMEN AGED 15–49 YEARS, NEW ENGLAND STATES, 1856–1925 *

Periods	Registered Births per Year per 1,000 Native Females Aged 15–49 Years											
	Maine		*New Hampshire*		*Vermont*		*Massachusetts*		*Rhode Island*		*Connecticut*	
1856–1860	—		—		—		76	*d*	—		—	
1861–1865	—		—		—		62		56	*d*	—	
1866–1870	—		—		—		64		64		—	
1871–1875	—		—		—		67		67		—	
1876–1880	—		—		—		64	*c*	67		—	
1881–1885	—		—		—		66		63		—	
1886–1890	—		53	*d*	—		65	*a*	60	*b*	64	*c*
1891–1895	—		57		—		65		61		64	
1896–1900	69	*c*	57		—		63		61	*a*	60	*d*
1901–1905	69		57		76	*d*	58		59		57	
1906–1910	75		62	*b*	77	*c*	60		59		55	*b*
1911–1915	75		65		77		60		59		56	
1916–1920	79		71	*a*	80	*b*	64		65		65	*a*
1921–1925	86		80		84		68		67		64	

* Adapted from Spengler, 1920, *The Fecundity of Native and Foreign-born Women in New England*, pp. 14, 33. Data for periods of less than 5 years, and rates based on periods in which the number of births registered was less than 10 per cent of number expected on basis of census data are omitted here.

[a] The number of births registered was 5 per cent or more *above* expectation on the basis of census data during this period.

[b] The number of births registered was *as high as* expectation, but not more than 5 per cent above expectation on the basis of census data during this period.

[c] The number of births was *below*, but not more than 5 per cent below, expectation on the basis of census data during this period.

[d] The number of births was more than 5 per cent *below* expectation on the basis of census data during this period.

APPENDIX E

PER CENT OF NATIVE WHITE WOMEN OF NATIVE PARENTAGE, AGED 15–44 YEARS, REPORTED AS MARRIED (NOT WIDOWED OR DIVORCED), BY STATES, 1900, 1930 *

Areas	1900	1930
United States	56.4	61.1
Maine	56.9	61.2
New Hampshire	56.5	57.4
Vermont	58.7	59.8
Massachusetts	48.6	49.2
Rhode Island	50.0	50.5
Connecticut	51.7	54.5
New York	52.1	56.3
New Jersey	53.8	58.4
Pennsylvania	53.4	58.5
Ohio	55.2	62.3
Indiana	59.5	64.1
Illinois	55.8	59.9
Michigan	59.3	64.3
Wisconsin	48.8	53.6
Minnesota	52.7	49.3
Iowa	56.4	58.7
Missouri	58.1	62.2
North Dakota	62.8	49.5
South Dakota	58.6	55.1
Nebraska	58.8	58.4
Kansas	59.6	62.3
Delaware	56.3	62.7
Maryland	50.5	60.9
Virginia	53.3	60.2
West Virginia	57.7	64.1
North Carolina	55.4	61.1
South Carolina	55.0	60.8
Georgia	57.1	61.6
Florida	61.6	65.8
Kentucky	59.1	64.7
Tennessee	57.5	62.7
Alabama	58.1	63.9
Mississippi	56.4	63.7
Arkansas	61.9	66.5
Louisiana	55.8	62.5
Oklahoma	68.7	67.6
Texas	62.0	65.3
Montana	65.0	62.3
Idaho	66.3	63.3
Wyoming	67.2	68.2
Colorado	61.9	63.0
New Mexico	70.5	65.7
Arizona	67.0	68.3
Utah	53.8	57.3
Nevada	55.9	67.2
Washington	63.0	62.7
Oregon	59.3	63.7
California	53.4	62.7

* Based on census data.

APPENDIX F

INFLUENCE OF INFILTRATION OF NEW STOCKS INTO NATIVE POPULATION OF THE NORTHEASTERN STATES ON FERTILITY RATES IN THIS AREA

The available data on fertility of native whites derived from different national groups seem to show that there is no clear evidence that native whites of foreign parentage are generally more fertile than native whites of native parentage living in the same localities. A tendency toward higher than average fertility for native whites, however, is generally characteristic of the first generation of native Americans derived from parental groups with high fertility, where these newer native groups are still strongly influenced by Old-World traditions. This tendency toward high fertility among some native groups of recent foreign extraction usually tends to disappear in later generations, especially among married couples with diverse ancestry; but high fertility may continue for a long time to be characteristic of particular nationality groups living in isolated rural communities, or preserving distinct religious traditions, or differentiated from their neighbors by cultural-intellectual, economic, or other social criteria.

The proportions of persons of foreign parentage among native white women of child-bearing ages in various sections of the United States is shown in the following table.

TABLE 1

Per Cent of Native White Women Aged 20–44 Years Who Were of Foreign or Mixed Parentage, by Geographical Divisions, 1920 and 1930

	1920	1930
United States	28.8	28.4
New England	47.2	52.9
Middle Atlantic	38.5	42.0
East North Central	35.4	33.1
West North Central	36.8	33.4
South Atlantic	5.3	5.8
East South Central	3.9	2.9
West South Central	9.6	7.4
Mountain	30.6	27.2
Pacific	35.5	32.8

Obviously there have been large recent accessions of foreign stocks into the class of young native white adults in the very sections where the effective fertility of native whites has recently seemed to be approaching stabilization or actual increase during several decades prior to 1930. There is, to be sure, a large proportion of persons of foreign extraction among the natives of the Pacific division, where fertility rates have reached a very low level. But the native whites of foreign parentage in the Pacific states, as a class, are made up of somewhat different national strains, and, as individuals, have probably broken away in most instances from their traditional culture patterns more completely than the native whites of foreign parentage in the Northeastern states.

The findings of a special study reported by Sydenstricker for Cattaraugus County, New York, indicate a period of stabilized fertility from 1900 to about 1925 in a farm population composed "almost entirely of native white families of the 'older native stock.'" The extent of admixture of newer stocks in the native white adult population of Cattaraugus County in 1930 may be inferred fairly accurately from the origin of the adult white population in this county a generation earlier, in 1900. At that time, 13.5 per cent of the total population, and 17.1 per cent of all males of "military age" (18–44 years) in Cattaraugus County were foreign born. But the foreign born of Cattaraugus County at this time were of types easily assimilated to the culture of the older families, and probably intermarried extensively with natives of native parentage—the largest groups being German (35 per cent), Irish (22 per cent), English Canadian (9 per cent), English (7 per cent), and Swedish (6 per cent). Sydenstricker combines the results of three sets of data, (1) samples of census data for native white women in Cattaraugus County, for 1900 and for 1910, with wives of farmers as a sub-class of each sample; (2) data collected in a special health survey in 1929, and (3) an analysis of birth data for Cattaraugus County, 1916–1925, with allocation of births to usual residence of mothers, by Downes. The findings of special interest to us are given in the following tables.

TABLE 2

ANNUAL FERTILITY RATES FOR RURAL WOMEN IN CATTARAUGUS COUNTY, 1916–1927 *

Year	Births per 1,000 Rural Women Aged 15–44 Years	Year	Births per 1,000 Rural Women Aged 15–44 Years
1916	97.9	1922	98.1
1917	87.2	1923	86.7
1918	94.8	1924	86.0
1919	89.2	1925	77.4
1920	96.7	1926	70.3
1921	100.6	1927	69.0

* From Downes, cited by Sydenstricker, 1932, p. 30 (Bibliog. I–III).

TABLE 3

CUMULATIVE BIRTH RATES (STANDARDIZED) FOR NATIVE WHITE WOMEN MARRIED TO FARMERS IN CATTARAUGUS COUNTY, AS REPORTED IN 1900, 1910, AND 1929 *

Year	Number of Wives in Sample		Standardized Rates per 1,000 Wives [a]	
	All Ages	*Under 45 Years*	*All Ages*	*Under 45 Years*
1900	1,128	637	285	251
1910	1,520	623	269	234
1929	598	301	298	276

* From Sydenstricker, 1932, p. 30 (Bibliog. I–III).

[a] Standardized on the basis of the age distribution of an urban and rural sample of 99,226 wives drawn from the 1910 census records.

It is suggested that the rise in the post-war birth rate (indicated by the fertility rates in Table 1) seems to be reflected in the apparently higher fertility of younger women in 1929 as compared with women of the same ages in 1900 and 1910. The author adds, "The drop in the birth rate since 1925 in this area may, however, present a different situation in 1935 or 1940; but that is another story for the future" (p. 31). He concludes as follows:

> "It is unwise, of course, to draw any sweeping conclusions from a single small population Nevertheless this study of fertility rates of native-white women in a rural area not greatly affected by urban influences up to 1930 is not without interest. It suggests one mode of research in population problems which, in this instance, yields suggestive evidence of unchanging fertility of our native stock under a not greatly changing environment. More evidence of this kind would throw light on the important question of whether or not the general decline in the fertility of our so-called 'older native stock' is a sign of lessened vitality or is a concomitant of changing environment and all that is implied thereby" (pp. 31–32).

We may carry the analysis further by analyzing the situation in several representative states in the Northeastern area: Maine, Vermont, Massachusetts, New York, Indiana, and Illinois. During the interval from the period 1895–1899 to the period 1925–1929, the effective fertility of married native white women apparently decreased 26 per cent in the United States as a whole, but increased 7 per cent in Maine and 6 per cent in Vermont, remained practically stationary in Massachusetts, and decreased 22 per cent in Indiana and 30 per cent in Illinois.[1] During this period there was a considerable accession of foreign stocks into the class of native whites in all these states, but most conspicuously in Massachusetts, both urban and rural, and in urban New York and urban Illinois.

TABLE 4

EFFECTIVE FERTILITY OF NATIVE WHITE WOMEN IN URBAN AND RURAL AREAS OF THE UNITED STATES AND SELECTED NORTHEASTERN STATES. DATA OF 1920 AND 1930, COMPARED WITH NATIONAL ORIGINS OF NATIVE WHITES IN 1930

Area		Children under 5 Years with Native White Mothers per 1,000 Native White Women Aged 20–44 Years			Per Cent Distribution of Native White Women Aged 20–44 Years by National Origins, 1930					
						Foreign or Mixed Parentage (Approximate Distribution) [b]				
		1920 Estimated [a]	*1930*	*Ratio for 1930 as per Cent of Ratio for 1920*	*Native Parentage (U.S.)*	*British and English Canadian* [c]	*Irish*	*German and Scandinavian*	*French Canadian, Italian, Polish*	*All Other*
Total U. S.	Urban	388	366	94.3	64.4	5.9	3.8	8.7	9.0	8.2
	Rural	721	653	90.6	81.9	3.3	1.0	7.3	2.4	4.0
Maine	Urban	388	420	108.2	60.9	13.5	3.8	1.5	18.1	2.2
	Rural	603	629	104.3	78.7	12.3	0.7	1.0	6.3	1.0
Vermont	Urban	408	394	96.6	67.8	8.4	4.4	1.7	15.0	2.7
	Rural	587	612	104.3	78.2	8.5	1.8	0.8	9.7	1.0
Massachusetts	Urban	354	364	102.8	40.2	15.3	12.9	3.6	18.6	9.4
	Rural	461	468	101.5	56.8	12.6	5.9	3.5	14.1	7.1
New York	Urban	331	322	97.3	45.8	5.9	6.8	9.1	17.4	15.0
	Rural	494	498	100.8	73.9	6.5	3.1	6.4	6.4	3.7
Indiana	Urban	427	411	96.3	84.7	4.1	1.1	6.2	2.3	1.6
	Rural	622	587	94.3	93.0	1.0	0.4	4.0	0.4	1.2
Illinois	Urban	366	341	93.2	52.3	5.1	4.1	15.9	11.1	11.5
	Rural	618	552	89.3	79.3	3.1	1.3	11.2	1.7	3.3

[a] Based on Thompson, *Ratio of Children to Women, 1920*, pp. 200–209.

[b] Native white women of foreign or mixed parentage are distributed by national origins of total native whites of foreign or mixed parentage in each area.

[c] Includes North-Irish, and all Canadian except French Canadian.

The type of foreign stock introduced into each must also be taken into account, of course. In 1900, the average number of children reported by women under 45 years of age, married 10 to 20 years, in Hill's sample for selected Northern areas, was 2.7 in the case of native whites of native parentage. The corresponding average was 2.9 for native wives of English or Scotch parentage and 3.3 for native wives of English Canadian parentage; 4.2 for native wives of Irish parentage; 3.9, 3.6, 4.6, and 4.2, respectively, for native wives of German, Swedish, Norwegian, and Danish ancestry; and 4.9 for native wives of French Canadian parentage and 5.1 for native wives of Polish ancestry. The number of Italian women in this sample was not sufficient to afford a significant average, but there is other evidence that this group is usually characterized by rather large families. It is quite probable, as we have seen, that the fertility of native wives derived from these different strains varies much less at present than at the time of this report. Nevertheless, it is probable that the fertility of native white women of Irish, German, or Scandinavian origin may be significantly higher than that of native white women of

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[1] *See* Appendix C.

TABLE 5

Changes in Effective Fertility of Native White Women in Selected States from 1895–1899 to 1925–1929, and in the Rural and Urban Parts of These States from 1915–1919 to 1925–1929, Compared with Changes Expected because of Accession of Persons of Foreign Parentage on Stated Hypothesis

Area	Effective Fertility for Native White Women, All Classes, as per Cent of Effective Fertility of Native White Women of Native Parentage, for 1930, on Stated Hypothesis [a]		Effective Fertility of Married Native White Women Aged 15–44 Years, 1925–1929, as per Cent of Corresponding Figure for 1895–1899	Effective Fertility of All Native White Women Aged 20–44 Years, 1925–1929, as per Cent of Corresponding Figure for 1915–1919
	Total	*Parts*	*Total*	*Parts*
United States	107		74	
Urban		110		94
Rural		104		91
Maine	107		107	
Urban		111		108
Rural		104		104
Vermont	107		106	
Urban		110		97
Rural		106		104
Massachusetts	115		99	
Urban		116		103
Rural		111		102
New York	115		79	
Urban		116		97
Rural		107		101
Indiana	103		78	
Urban		103		96
Rural		102		94
Illinois	111		70	
Urban		113		93
Rural		105		89

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[a] On the arbitrary hypothesis that native white women of French Canadian, Italian, or Polish origin have 50 per cent more, and that native white women of German, Irish, or other foreign, except British or English Canadian, origin have 25 per cent more living children than native white women of native parentage who live in the same areas. In the procedure on which this table is based, the percentage of native white women aged 20–44 years who were of foreign or mixed parentage is computed directly for each area from census data; but this percentage is then distributed by various national origins in proportion to the corresponding distribution of the total native white population of foreign or mixed parentage (all ages) in each area.

native parentage living in the same communities; and the fertility of native whites of French Canadian, Italian, and Polish parentage may be much higher. An attempt to take this factor into account in several selected areas is reported in Tables 4 and 5.

Reviewing these data, it is clearly apparent that there was much less decline during recent decades among native whites in the Northeastern states than in other parts of the United States, even after a fairly large allowance is made for possible disproportionately high fertility among some of the newer elements in the native population. Among old native families in Maine and Vermont, there has apparently been little or no decline in fertility, and a real increase in the index of net reproduction during recent years. In Massachusetts and in New York there has apparently been considerable decline in fertility among old native families, but distinctly less than in other parts of the United States during recent years. We conclude that in this part of the United States effective fertility was approaching stabilization in the early decades of the Twentieth Century.

Incidentally, it is interesting to compare ratios of children to women in these areas with the replacement quota for total white population, 1930 (*see* Appendix B). Effective fertility in 1925–1929 in the urban areas appears as only 5 per cent below replacement quota in Maine; in other states it runs: Vermont, 11 per cent below; Massachusetts, 18 per cent below; New York, 27 per cent below; Indiana, 7 per cent below; Illinois, 23 per cent below. In rural areas effective fertility at this time runs about as follows: Maine, 42 per cent above; Vermont, 38 per cent above; Massachusetts, 6 per cent above; New York, 12 per cent above; Indiana, 33 per cent above; and Illinois, 25 per cent above replacement quota.

APPENDIX G

DEMOGRAPHIC FACTORS AFFECTING THE RURAL-URBAN DIFFERENTIAL IN FERTILITY

We found that, according to 1930 data for the white population of the United States, the reproduction rate per generation of the rural-farm population was about 60 per cent higher than that of the total nonfarm population (rural-nonfarm and urban, combined). We noted that this differential was due in part to variations among communities in the same part of the country, and in part to the scattering of the rural population through isolated areas where birth rates are especially high (*see* Chapter II). We also noted, in Chapter IV, that the average force of fertility of all fertile farm women was only about 32 per cent above that of all fertile nonfarm women (i.e., women reporting the fathers of children born in 1928 as engaged in occupations other than agriculture, animal husbandry, or forestry). We estimated that if the corresponding data had been available for all married women, rather than merely for all mothers, the index of fertility for the farm wives would have been 42 per cent higher than that for the nonfarm wives. And if the index had been based on data for all women at specified ages (regardless of marital condition), we estimated that this ratio of the fertility of the rural population to the fertility of the urban population (1.42 to 1.00) would have been raised 11 per cent, becoming 1.58 to 1.00. This appendix will be devoted to an examination of data on the age and sex distribution of rural-farm, rural-nonfarm, and urban groups as relating to the marital condition of rural-farm women.

TABLE 1

MARITAL CONDITION OF FEMALES AGED 20–44 YEARS IN URBAN, RURAL-NONFARM, AND RURAL-FARM GROUPS, 1930

Population Group	Number[a]	Percentage Distribution				
		Single	*Ever-Married*	*Wives*	*Widows*	*Divorced*
Total	23,424,703	21.6	78.4	73.0	3.7	1.7
Urban	14,703,712	24.3	75.7	69.7	3.9	2.1
Rural-nonfarm	4,182,325	17.2	82.8	77.9	3.5	1.4
Total, *except* rural-farm	18,886,037	22.7	77.3	71.6	3.8	1.9
Rural-farm	4,538,666	17.1	82.9	79.3	2.8	0.8
Ratio of number or percentage for rural-farm to corresponding value for total *except* rural-farm	*Per Unit* .240	*Per Unit* .75	*Per Unit* 1.07	*Per Unit* 1.11	*Per Unit* .74	*Per Unit* .42

[a] Exclusive of persons whose marital condition or age is unknown.

The marital condition of women aged 20–44 years of age, classified according to type of community is shown in Table 1. Interestingly enough, in spite of the high proportion of married women in the rural-farm group, and in spite of the high ratio of young men to young women and of old men to old women on farms, the number of men aged 30–39 years living on farms is apparently no greater than the number of women living on

TABLE 2

Males per Hundred Females for Urban, Rural-Farm, and Rural-Nonfarm Population, Selected Age Classes, All Race-Nativity Classes, 1930

	Urban	Rural-Nonfarm	Rural-Farm
Under 5	103	103	103
15–19	92	98	115
20–24	89	98	116
25–29	94	102	105
30–34	98	106	99
35–39	102	111	100
40–44	106	114	106
45–49	106	115	113
60–64	95	109	140
80–84	73	99	117

farms at these ages (*see* Table 2). By carrying through a somewhat more elaborate analysis we can trace the relative attraction of each type of community for native white persons of each sex at different ages. In this analysis two factors are held constant, (1) changes in the proportion of persons living at different ages in the total white male and in total white female population, and (2) transfers of whole families from one type of community to another (due in part to changes in the census classification of the same places, and in part to migration), as represented by the ratio of native white children aged 10–14 in each community group in 1930 to native white children aged 0–4 in same group in 1920. By holding these two factors constant we can get some idea of the selective pull of city and village life for persons of each sex at different ages, during the decade in question (*see* Tables 3, 4, and 5).

TABLE 3

Ratio of Persons at Specified Ages to Persons Ten Years Younger, as Given for Native Whites by Census Data of 1920 and 1930, for Total, Urban, Rural-Nonfarm, and Rural-Farm Groups

Age Classes, by Sex 1930/1920	Ratio of Specified Classes in 1930 to Classes Ten Years Younger in 1920			
	Total	*Urban*	*Rural-Nonfarm*	*Rural-Farm*
Males	(R)	(R_1)	(R_2)	(R_3)
10–14/0–4	1.005	1.064	.973	.938
15–19/5–9	.979	1.081	.909	.880
20–24/10–14	.952	1.199	.963	.642
25–29/15–19	.955	1.243	1.054	.546
30–34/20–24	.957	1.086	1.038	.667
35–39/25–29	.993	1.051	1.058	.826
40–44/30–34	.979	1.023	1.005	.875
45–49/35–39	.908	.944	.918	.835
Females				
10–14/0–4	1.008	1.084	.980	.911
15–19/5–9	.995	1.169	.949	.784
20–24/10–14	.997	1.315	.985	.572
25–29/15–19	.979	1.227	1.030	.561
30–34/20–24	.934	1.026	.979	.706
35–39/25–29	.967	1.020	.977	.836
40–44/30–34	.956	1.013	.953	.841
45–49/35–39	.912	.969	.919	.797
Both sexes				
10–14/0–4	1.0067	1.0738	.9761	.9244

TABLE 4

Index of Rural-Urban Migration at Different Ages. Ratio of Specified Class in 1930 to Class Ten Years Younger in 1920, for Urban, Rural-Nonfarm, and Rural-Farm, Expressed as Proportion of Corresponding Ratio for All Areas *

Males: Age Classes	Urban R_1/R	Rural-Nonfarm R_2/R	Rural-Farm R_3/R
10–14/0–4	1.059	.968	.933
15–19/5–9	1.104	.929	.899
20–24/10–14	1.260	1.012	.674
25–29/15–19	1.302	1.104	.572
30–34/20–24	1.135	1.085	.697
35–39/25–29	1.058	1.066	.832
40–44/30–34	1.045	1.027	.894
45–49/35–39	1.040	1.011	.920
Females: Age Classes			
10–14/0–4	1.075	.972	.904
15–19/5–9	1.175	.954	.788
20–24/10–14	1.319	.988	.574
25–29/15–19	1.253	1.052	.573
30–34/20–24	1.099	1.048	.756
35–39/25–29	1.055	1.010	.865
40–44/30–34	1.060	.997	.880
45–49/35–39	1.062	1.008	.874
Both Sexes: Age Classes			
10–14/0–4	1.066	.970	.918

* Values for R, R_1, R_2, and R_3, from previous table.

TABLE 5

Index of Rural-Urban Movement during the Preceding Decade for Native Whites of Specified Sex and Age in 1930, Relative to Corresponding Movement of Children of Both Sexes Aged 10–14 Years in 1930 (0–4 Years in 1920) *

Classes by Sex and by Age in 1930	Urban	Rural-Nonfarm	Rural-Farm
Males			
15–19	1.04	.96	.98
20–24	1.18	1.04	.73
25–29	1.22	1.14	.62
30–34	1.06	1.12	.76
35–39	.99	1.10	.91
40–44	.98	1.06	.97
45–49	.98	1.04	1.00
Females			
15–19	1.10	.98	.86
20–24	1.24	1.02	.63
25–29	1.18	1.09	.62
30–34	1.03	1.08	.82
35–39	.99	1.04	.94
40–44	.99	1.03	.96
45–49	1.00	1.04	.95

* Values given in Table 4, divided by corresponding values at the foot of each column.

It appears that women are attracted away from farm communities at an earlier age than men. Thus some 43 per cent of those who in 1920 had been girls aged 10–14 years living on farms, had moved to villages or cities before their enumeration as women aged

20–24 years in 1930 (*see* Table 4). A similar percentage of the young women aged 15–19 years on farms in 1920 were also found in villages and cities when enumerated ten years later as women aged 25–29 years. The migration of these older young women was matched by an equal migration of men at the same ages, although this was not so in the case of the younger group, aged 20–24 years in 1930. It also appears that a net movement of women from farms to villages and cities continued during this decade for all the age classes considered here, although such a net movement is not found in the case of the older males. Finally, among older people many more men than women settle in rural communities, especially on farms.

Movements of population among different types of communities may affect marital conditions among women in several different ways. In so far as women who do not differ in personal characteristics from their married sisters and friends move to villages and cities because they happen to find themselves single or widowed or divorced, the true differential in reproduction trends between rural and urban stocks is fictitiously exaggerated. In other words the apparently high reproduction rate for rural areas as affected by such cases is simply due to the fact that these unmarried women have moved elsewhere. But in so far as cities exercise a selective attraction for particular types of people, and in so far as city conditions causally favor celibacy, widowhood, and divorce, the resultant differences in marital condition are socially significant. It is impossible exactly to weigh these two aspects of the apparent rural-urban differential in effective fertility. But, in any case, difference in marriage rates is only responsible for about one-fourth of the net rural-urban differential in reproduction rates, as noted above. Size of family may also exercise some influence on the decisions of married couples regarding farm, village, or city residence. Thus it seems likely that the apparent rural-urban differential in effective fertility is due in part (perhaps one-sixth, perhaps one-fifth, perhaps one-fourth) to the influence of marital condition and size of family in causing village and city residence, but in much larger part to the influence of urban conditions in causing later, less frequent, and less permanent marriages and smaller families.

APPENDIX H

DISTRIBUTION OF POPULATION OF THE UNITED STATES, BY RACE, NATIVITY, AND NATIONAL ORIGIN, 1920, 1930 *

Groups	1920		1930	
	Number (Estimated)	*Per Cent*	*Number*	*Per Cent*
Total	105,913,349 [a]	100	122,775,046	100
White	94,120,374 [b]	88.9	108,864,207	88.7
Native	80,864,980 [c]	76.4	95,497,800	77.8
Colonial	40,172,800	*39.0*		
Postcolonial	41,288,570 [c]	*37.4*		
Foreign-born	13,255,394 [d]	12.5	13,366,407	10.9
White	94,120,374 [d]	88.9		
Origin, Northwest Europe		70.8		
Native, Colonial	40,172,800	*37.9*		
Native, Postcolonial	29,289,971	*27.7*		
Foreign-born	5,516,202	*5.2*		
Origin, Central and East Europe		9.5		
Native, Colonial	86,000	*0.1*		
Native, Postcolonial	5,555,513	*5.2*		
Foreign-born	4,448,737	*4.2*		
Origin, South Europe		3.9		
Native, Colonial	62,100	*0.1*		
Native, Postcolonial	2,084,956	*2.0*		
Foreign-born	1,911,213	*1.8*		
Canada and other non-quota countries		4.7		
Native, Colonial	967,670	*0.9*		
Native, Postcolonial	2,645,970	*2.5*		
Foreign-born	1,379,242	*1.3*		
Negro	10,613,131 [e]	10.0	11,891,143	9.7
Indian	297,166 [f]	0.3	332,397	0.3
Mexican	700,541	0.7	1,422,533	1.2
Other races	182,137	0.2	264,766	0.2

* Data from *Fifteenth Census, Population, Vol. 2, Composition and Characteristics of Population; U. S. Senate Documents, 70th Congress, 2nd Session,* No. 259, Immigration Quotas on the Basis of National Origin (the report of the committee comprising the Secretaries of State. Commerce, and Labor, appointed to study the question of nation origin); Carpenter, Niles, 1927, *Immigrants and Their Children, 1920* (U. S. Census Monograph VII), p. 78.

[a] Estimated on the basis of adjustments specified below, to eliminate certain fictitious changes in proportions between 1920 and 1930. These adjustments do not purport to eliminate repeated tendencies toward under-enumeration, especially of young children.

[b] Original figure minus 700,541 Mexicans (Census estimate, 1930).

[c] Original figure minus 243,181 Mexicans (Census estimate, 1930).

[d] Original figure minus 457,360 Mexicans (Census estimate, 1930).

[e] Original figure, plus 150,000 not enumerated (Census estimate, *Fifteenth Census, Population,* Vol. 2, p. 26).

[f] Geometric mean of 1910 and 1930 enumerated populations.

APPENDIX I

NOTES ON METHOD OF OBTAINING NET REPRODUCTION INDICES FOR OCCUPATIONAL CLASSES FROM BIRTH AND CHILD MORTALITY STATISTICS

The official *Birth, Stillbirth and Infant Mortality Statistics for the United States Birth Registration Area*, from 1923 through 1929, supply data on "number of children ever-born" and "number of children living" (including the infants just born) reported by mothers of newborn infants each year, classified by age of mother and occupation of father. These data have been used by Pearl, 1927, and by Ogburn and Tibbitts, 1929 [1]; but they have not received as much general recognition as they deserve. Unfortunately, this sort of analysis has recently been discontinued in line with policies frequently referred to as "governmental economy." [2]

The 1928 statistics are used here to supply an approximate "index of reproduction" for each occupational class in the United States. The average number of children ever-born per mother might be used in this way; but this figure would be subject to serious bias by transfer of families to different occupational classes at advanced ages. If young fathers tend to be listed as clerks, railway firemen, or soldiers, who later appear as managers, railway engineers, or skilled manual workers, the former set of occupations would obviously show fictitiously low ratios of children per mother. In order to limit the influence of occupational shifts and yet to preserve sufficiently broad samples, the rates used below will be derived from two age groups of mothers: 30–34 years and 35–39 years.

Variations in the fertility of mothers in different occupational groups are represented by the mean of the averages for number of children ever-born per mother aged 30–34 and number of children ever-born per mother aged 35–39. Variations in fertility of mothers as modified by frequency of deaths of young children are then represented by the mean of the averages for number of children living per mother aged 30–34 and number of children living per mother aged 35–39. The difference between the mean values thus obtained for average number of children born and average number of children living gives an index of "child mortality" for each occupational class. For all occupations combined the average numbers thus obtained are: 5.058 children born, and 4.492 children living. The difference between these figures is .566, giving 112 deaths (between birth and date of report) per 1,000 infants born alive. We may estimate, very roughly, that this rate is equal to about half the average total reproductive loss per generation, due to deaths of females at all ages between birth and end of the childbearing period, at the health conditions generally prevalent in the United States in the period represented by these figures. A more exact determination of this relationship would have little effect on the *relative* values with which we are here concerned. Mortality is at least as sensitive to environmental conditions at early ages as at any other time. Therefore, if we estimate net reproductive loss in each occupational class as twice the difference between the values for number of children born and for number of children living, we shall be making adequate allowance for differential mortality. Obviously, this is a very rough procedure, but it seems much better than leaving differential mortality out of account altogether. In this way we can obtain a series of *relative net reproduction values* for mothers in different occupational classes, as follows: mean of average numbers of children ever-born per mother aged 30–34 and per mother aged 35–39 in each occupational class minus twice the difference between this figure and the mean of average numbers of children reported as living by these mothers.

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[1] *See* Bibliography IV.

[2] This table has been temporarily discontinued by the Bureau of the Census; but the present writers understand that it is not to be discontinued permanently.

The values thus obtained constitute a scale in which each value is merely relative to the other values in the series. But another step may be taken very simply. We have found that the effective fertility of the total population of the United States, exclusive of the rural-farm population, was just about sufficient in 1925–1929 to afford permanent population replacement in the case of the total nonfarm population of the United States.[3] Therefore, the net reproduction value obtained for mothers in all occupational classes except agriculture may be regarded as approximately representing the reproductive trend of a stationary population. The net reproduction value (using absolute figures for mothers aged 30–39) obtained for mothers in all occupational classes except agriculture is $4.6460-2(4.6460-4.1014)=3.557$. This final value, 3.557, may then be taken as a base number (=100) in calculating a series of *reproduction indices* which may be accepted as corresponding roughly to absolute reproductive rates in the latter half of the decade ending in 1930. For example, bakers (96), machinists (97), mail-carriers (98), and clergymen (98) appear to be having nearly enough children to effect equal survival; gardeners, florists, fruit growers, and nurserymen (103), mine operators, officials, and managers (101), painters, glaziers, etc. (104), and barbers, hairdressers, and manicurists (101), appear to be having a few more children than sufficient to effect this result. No significance can be attached to such slight differences, of course, because of the merely approximate accuracy of the method. On the other hand, we may accept with a fair degree of confidence such variations as are found between all agricultural occupations (132), or all mining occupations (131), and all clerical occupations (76). Incidentally, it is interesting to note that gross natality in some classes (e.g., miners) may be considerably higher than in some other classes (e.g., farmers), although the farmer may have a lower net reproduction index, due to unusually high child mortality in miners' families. The indices thus obtained represent approximate net reproduction rates per generation for specified occupational classes, as influenced by varying degrees of fertility among all fertile women in each occupational class for the total birth registration area of the United States, excepting states which omit data on age or occupation.[4]

There are, necessarily, many real limitations in this method. Other difficulties which may at first appear serious disappear on closer examination.

The problem of differences in marriage rates among different social classes, a very real difficulty, is given attention in the text, and therefore need not be discussed again here.

This procedure also excludes the influence of variations in the frequency of childlessness in different classes. Percentages of childless wives at ages 40–44 years in the Milbank sample of 1910 census data (unbroken families, wives of native white parentage, in the Northern United States) are reported for six occupational groups, as follows:[5]

Occupational Classes	Per Cent Childless
Professional	19.8
Business and clerical	17.9
Skilled manual	17.4
Unskilled manual	16.3
Farm owners	10.6

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[3] Chapter II.

[4] In 1928, the states not in registration area were: S. Dakota, Texas, Nevada, New Mexico. Other states without data necessary for this table were Maine, New Hampshire, Massachusetts, Rhode Island, and Colorado. The omitted states include regions of low fertility and regions of high fertility.

[5] From Notestein, 1931, "The Decrease in Size of Families from 1890 to 1910," *The Quarterly Bulletin of the Milbank Memorial Fund*, Vol. 9, p. 184.

It appears that reproduction indices for occupational classes with reference to all wives, aged 30–39, might differ somewhat from such indices obtained with reference to mothers at these ages. Among the nonfarm groups the necessary corrections usually would be small in comparison with variations in degrees of fertility among all fertile women. We cannot tell whether the net effect of such corrections would tend, in general, to widen or to reduce the differentials otherwise indicated for urban occupational groups, but a widening effect seems much the more probable. The differential between farm and nonfarm groups, however, would be greatly raised by such a correction.[6]

The method used omits from the count all births occurring to mothers confined at age 40 or over. The validity of such a procedure depends on distribution of births at different age levels in different occupational classes. The relevant data for several occupational groups, selected as critical cases, are given in Table 1.

TABLE 1

Per Cent of All Births Occurring to Mothers at Specified Ages in Selected Occupational Classes, United States Birth Statistics, 1928

Occupational Classes	Percentage of Total Births Occurring at Specific Ages [a]		
	30–34	*35–39*	*40 or Over*
All occupations except agriculture, etc.	18.0	10.6	3.5
Agriculture, forestry, and animal husbandry	17.5	13.4	5.8
Extraction of minerals	16.5	21.1	4.8
Manufacturing and mechanical industries	17.2	10.9	3.8
Laborers, building, general, and not specified	15.3	11.0	4.2
Trade	21.3	11.1	3.2
Bankers, brokers, and money lenders	26.8	12.8	3.0
Professional service	23.2	11.2	3.0
Lawyers, judges, and justices	27.1	12.7	3.3
Physicians and surgeons	27.8	14.3	3.1

[a] Omitting cases (about 2 per 1,000) in which age of mother is unknown.

There is not, apparently, a great range of variation among occupational classes in the percentage of children born to women 40 years of age or over. The highest percentages of such very late births usually appear in the case of occupations with high fertility rates to mothers below 40 years of age. If these late births were taken into account, the base (all occupations except agriculture) used in calculating the reproduction indices would be raised 3.5 points. The index for agricultural occupations (relative to this new base) would then be raised about 2.3 per cent. The index for the mining group would be raised about 1.3 per cent. And the index for the professional group would be reduced about 0.5 per cent.

A disturbance operating in the reverse direction, however, may be expected in the case of the professional group. It appears most conspicuously in the case of physicians. In all occupations except agriculture, 67.9 per cent of all births occur to mothers less than 30 years of age, but in the professional group only 62.6 per cent, and in the case of physicians only 54.8 per cent of all births are ascribed to women less than 30 years of age. In professional families, therefore, births to wives aged 30–39 must be distributed somewhat more widely as regards proportional position in completed fraternities, than is the case with other classes. And in the procedure used here the statistical weight of other births is relative to the proportional birth-order position of the birth recorded. However, practically all of the disturbance due to this circumstance must be concentrated in the age group 30–34. For although somewhat higher percentages of births appear at ages 35–39 in the case of the professional group, lower percentages are found at all ages over 39. We may then measure the force of the disturbing factor by comparing reproduction indices of the sort described above with comparable indices obtained by limiting the analysis to the age class, 35–39 years. We find that values obtained in this way do not differ by more than about one per cent from the values reported above.

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[6] *See* Appendix G.

The occupational classification reported by physicians in maternity cases are probably more or less inaccurate. Census data on occupations are also more or less inaccurate. The present method, like the method used in the Milbank studies, has the advantage of working within one set of occupational data. It is, therefore, free from the difficulties besetting attempts to derive occupational birth rates by combining birth statistics with census data.

On the whole, the method here described seems to the writers to give both as accurate and as economical an approach to the measurement of variations in the reproductive force of marriages among occupational groups in the United States as is possible with any data now available. The method does not, however, have sufficient refinement so that variations of a few points between occupational classes can be regarded as having any significance. The one-place decimal values supplied in the official statistics and used in the analysis may in themselves give results one or two points off from the results which might be obtained with three-place decimals. Variations due to factors not taken into account are, of course, much more to be feared. Our preliminary survey, however, has shown that none of the primary factors left out of account would be likely to cause any considerable change in the results which appear in the text, *except* as regards variations in marriage frequencies among occupational classes and variations in the frequency of childless marriages.[7]

[7] On these points, *see* Chapter IV and Appendix G.

APPENDIX J

MARITAL CONDITION OF GAINFULLY EMPLOYED MALES IN EACH OCCUPATION WITH 100,000 OR MORE MALE WORKERS, 1900*

Occupations	Per Cent Who Are Aged 25 Years or Over	Per Cent Who Are Married, Widowed, or Divorced	Difference [a]
All occupations	71.4	59.5	11.9
Clergymen	96.8	79.5	17.3
Physicians and surgeons	95.0	77.7	17.3
Watchmen, policemen, firemen	94.9	81.7	13.2
Manufacturers and officials	94.3	82.8	11.5
Lawyers	93.3	72.0	21.3
Farmers, except farm laborers	91.6	87.3	4.3
Merchants and dealers, except wholesale	90.9	79.3	11.6
Carpenters and joiners	89.8	77.5	12.3
Masons (brick and stone)	88.8	74.9	13.9
Agents	88.2	73.0	15.2
Engineers and firemen (not locomotive)	86.0	72.6	13.4
Blacksmiths	84.2	74.6	9.6
Painters, glaziers, and varnishers	78.9	63.6	15.3
Butchers	77.9	66.1	11.8
Steam railroad employees	77.8	62.4	15.4
Tailors	77.6	68.4	9.2
Boot and shoe makers and repairers	76.4	64.9	11.5
Barbers and hairdressers	74.6	62.8	11.8
Draymen, hackmen, teamsters, etc.	72.6	60.8	11.8
Miners and quarrymen	71.6	53.8	17.8
Iron and steel workers	70.5	59.1	11.4
Bookkeepers and accountants	69.7	50.5	19.2
Machinists	69.5	57.2	12.3
Teachers and professors in colleges	69.4	47.2	22.2
Woodworkers, not otherwise specified	69.1	58.9	10.2
Laborers, not specified	67.4	52.5	14.9
Farmers, including farm laborers	66.4	59.3	7.1
Saw and planing mill employees	66.0	55.6	10.4
Servants and waiters	62.1	36.5	25.6
Printers, lithographers, and pressmen	62.0	46.6	15.4
Salesmen	59.4	43.2	16.2
Clerks and copyists	56.6	39.2	17.4
Cotton mill operatives	45.6	44.0	1.6
Farm laborers	30.3	19.2	11.1

* Abridged from *Twelfth Census, 1900, Special Reports, Occupations*, pp. ccxv–ccxviii.

[a] Large differences (over 20 points) also appear for the following smaller groups, not included above: Launderers, bartenders, soldiers and sailors, actors, boatmen, lumbermen, hostlers, musicians, civil engineers, stock raisers, wood choppers, dentists, and architects.

APPENDIX K

EFFECTIVE FERTILITY OF FARM POPULATION BY COUNTIES, IN RELATION TO AVERAGE VALUE OF FARM PRODUCTS, 1929, OR AVERAGE VALUE OF FARMS, 1930, SELECTED STATES

TABLE 1

Data for Selected Northern States [a]

1. CHILDREN UNDER 5 PER 1,000 WOMEN AGED 15–44 YEARS (1930) IN RURAL-FARM POPULATION OF COUNTIES WITH SPECIFIED GROSS VALUE OF FARM PRODUCTS, 1929

State	Under $1,600	$1,600–$2,400	$2,400–$3,200	$3,200–$4,000	$4,000–$4,800	$4,800 and Over
Illinois	486	466	450	473	481	—
Iowa	—	463	497	493	527	—
Nebraska	—	480	494	509	561	558
North Dakota	—	—	576	535	—	—

2. MEAN PERCENTAGE [b] OF FARMS OPERATED BY TENANTS, IN COUNTIES GROUPED BY VALUE OF PRODUCTS

State	Under $1,600	$1,600–$2,400	$2,400–$3,200	$3,200–$4,000	$4,000–$4,800	$4,800 and Over
Illinois	27.6	38.6	49.4	55.0	56.8	—
Iowa	—	36.2	43.5	50.3	55.1	—
Nebraska	—	39.7	46.6	47.4	43.9	43.8
North Dakota	—	—	37.9	38.1	—	—

3. MEAN PERCENTAGE [b] OF ALL AGRICULTURAL WORKERS WHO ARE WAGE WORKERS, IN COUNTIES GROUPED BY VALUE OF PRODUCTS

State	Under $1,600	$1,600–$2,400	$2,400–$3,200	$3,200–$4,000	$4,000–$4,800	$4,800 and Over
Illinois	22	29	33	36	38	—
Iowa	—	19	23	29	32	—
Nebraska	—	21	19	24	28	30
North Dakota	—	—	29	33	—	—

4. MEAN PERCENTAGE [b] OF ILLITERACY, RURAL-FARM POPULATION, IN COUNTIES GROUPED BY VALUE OF PRODUCTS

State	Under $1,600	$1,600–$2,400	$2,400–$3,200	$3,200–$4,000	$4,000–$4,800	$4,800 and Over
Illinois	2.0	1.3	0.7	0.6	0.6	—
Iowa	—	0.9	0.6	0.4	0.3	—
Nebraska	—	0.5	0.6	0.6	0.5	0.4
North Dakota	—	—	1.1	0.9	—	—

[a] Exclusive of areas of urban influence, or of foreign-born influence (*see* text, Chapter IV).
[b] Mean of county percentages.

TABLE 2

DATA FOR WHITE POPULATION OF SELECTED SOUTHERN STATES[a]

1. CHILDREN UNDER 5 PER 1,000 WOMEN AGED 15–44 YEARS IN WHITE RURAL-FARM POPULATION OF COUNTIES WITH SPECIFIED AVERAGE VALUE OF FARMS OPERATED BY WHITES, 1930

State	Under $1,600	$1,600–$2,400	$2,400–$3,200	$3,200–$4,000	$4,000 and Over
Alabama	671	643	619	589	507
North Carolina	—	665	634	615	566

2. MEAN PERCENTAGE[b] OF ILLITERACY, WHITE POPULATION, IN COUNTIES GROUPED BY VALUE OF FARMS OPERATED BY WHITES

State	Under $1,600	$1,600–$2,400	$2,400–$3,200	$3,200–$4,000	$4,000 and Over
Alabama	6.1	6.4	6.1	3.3	2.4
North Carolina	—	8.0	6.6	5.6	5.2

[a] Exclusive of areas of urban influence.
[b] Mean of county averages.

TABLE 3

DATA FOR NEGRO POPULATION OF SELECTED SOUTHERN STATES[a]

1. CHILDREN UNDER 5 PER 1,000 WOMEN AGED 15–44 YEARS IN NEGRO RURAL-FARM POPULATION IN COUNTIES WITH SPECIFIED AVERAGE VALUE OF FARMS OPERATED BY NEGROES, 1930

State	Under $1,000	$1,000–$2,000	$2,000 and Over
Alabama	567	589	561
North Carolina	—	657	666

2. MEAN PERCENTAGE[b] OF ILLITERACY, NEGRO POPULATION, IN COUNTIES GROUPED BY VALUE OF FARMS OPERATED BY NEGROES

State	Under $1,000	$1,000–$2,000	$2,000 and Over
Alabama	32.4	26.9	25.1
North Carolina	—	20.2	21.8

[a] Exclusive of areas of urban influence.
[b] Mean of county percentages.

APPENDIX L

INTELLIGENCE RATINGS OF EUROPEAN APPLICANTS FOR IMMIGRATION TO THE UNITED STATES

TABLE 1

MEDIAN TEST AGE ON FOUR TESTS BY LOCALITY, MALE IMMIGRANTS, AGED 15–44 YEARS *

Origin	Number of Cases				Test Age			
	Ferguson Form Boards	*Pintner Non-Language*	*Porteus Maze*	*Koh's Block Designs*	*Ferguson Form Boards*	*Pintner Non-Language*	*Porteus Maze*	*Koh's Block Designs*
Urban								
Norway	41	41	41	—	17.0	16.48	15	—
England and Wales	17	17	17	—	16.67	16.63	15	—
Germany								
Cologne	85	85	85	—	15.33	14.28	13.5	—
Stuttgart	72	72	72	20	15.67	14.41	13.5	14.17
Irish Free State	30	19	—	—	13.83	11.21	—	—
South Italy	—	—	—	—	—	—	—	—
Rural								
Norway	97	97	97	—	16.67	15.5	15	—
Sweden	104	100	—	—	15.83	14.28	—	—
England and Wales	12	12	11	—	15.83	16.39	15	—
Germany								
Cologne	52	52	52	—	15.33	11.63	13	—
Stuttgart	53	53	53	29	16.0	14.34	14.5	14.08
Irish Free State	232	129	114	20	12.67	9.5	13.5	11.25
South Italy	41	19	37	19	10.5	8.43	12.5	9.25

* From exhibit by Lawrence Kolb, United States Public Health Service, at the Third International Eugenics Congress, New York City, 1932.

TABLE 2

MEDIAN TEST AGE ON FOUR TESTS BY LOCALITY, FEMALE IMMIGRANTS, AGED 15–44 YEARS *

Origin	Number of Cases				Test Age			
	Ferguson Form Boards	*Pintner Non-Language*	*Porteus Maze*	*Koh's Block Designs*	*Ferguson Form Boards*	*Pintner Non-Language*	*Porteus Maze*	*Koh's Block Designs*
Urban								
Norway	80	82	80	—	16.67	16.39	15	—
England and Wales	27	27	27	—	14.83	14.19	13.5	—
Germany								
Cologne	108	104	97	—	14.33	12.82	13	—
Stuttgart	81	81	80	29	15.0	14.34	13	13.5
Irish Free State	35	18	17	13	11.33	8.64	10.5	10.83
South Italy	—	—	22	18	—	—	10	9.08

TABLE 2—*Continued*

Origin	Number of Cases				Test Age			
	Ferguson Form Boards	*Pintner Non-Language*	*Porteus Maze*	*Koh's Block Designs*	*Ferguson Form Boards*	*Pintner Non-Language*	*Porteus Maze*	*Koh's Block Designs*
Rural								
Norway	120	126	119	—	16.5	15.39	15	—
Sweden	75	81	—	—	15.33	13.44	—	—
England and Wales	14	14	14	—	14.0	14.22	14.5	—
Germany								
Cologne	50	47	44	—	14.33	12.38	13	—
Stuttgart	85	85	85	53	14.17	12.56	13	13.5
Irish Free State	242	97	90	113	10.5	8.78	11.5	10.17
South Italy	38	15	53	21	9.33	8.54	9.5	8.0

* Same source as Table 1.

TABLE 3

DISTRIBUTION OF SCORES ON FERGUSON FORM BOARD TEST. MALE IMMIGRANTS, AGED 15–44 YEARS *

	Norway	Sweden	England and Wales	Germany (Stuttgart)	Irish Free State	South Italy
Number of cases	138	107	43	155	279	131
Percentiles:[a]						
100th (Highest score)	25	23	23	25	22	22
90th	23	21	19	21	18	19
80th	22	21	18	19	16	16
70th	21	20	18	19	15	15
60th	21	19	17	18	14	14
50th (Median score)	20	18	17	18	13	13
40th	20	18	16	16	12	11
30th	19	17	16	16	11	10
20th	18	16	14	15	9	9
10th	17	14	13	14	8	8
(Lowest score)	12	10	2	9	4	1

* Same source as Table 1.

[a] These percentile scores represent the number of points scored by the top individual, the individual 90 per cent from the bottom, the individual 80 per cent from the bottom, and so forth among all individuals in each group.

APPENDIX M

SEVEN INDICES OF THE CULTURAL-INTELLECTUAL DEVELOPMENT OF STATE POPULATIONS AT THE TIME OF THE WORLD WAR OR THE FOURTEENTH CENSUS *

States	Army Alpha Examination, White Draft		Magazine Circulation per 100 Total Population, 1922		"Who's Who in America, 1922–1924," per 10,000 Average Total Population 1850–1880	Illiterate per 100 Native White of Native Parentage, 1920	Inaccuracies in Census Returns, for Whites Only
	Median Scores	*Per Cent of A-B Grades*	*"Widely Read" List*	*"Highbrow" List*			
	1	*2*	*3*	*4*	*5*	*6*	*7*
Maine	57.9	16.1	15.99	1.37	8.3	1.3	16.7
NewHampshire	53.8	17.2	16.48	1.84	9.9	0.6	9.0
Vermont	61.5	19.3	16.52	1.67	9.8	1.1	8.3
Massachusetts	67.5	21.8	17.89	1.62	14.6	0.3	4.6
Rhode Island	60.0	12.4	15.15	1.23	11.2	0.5	7.5
Connecticut	70.5	21.0	17.27	1.61	11.8	0.4	6.8
New York	58.3	15.0	14.66	1.53	8.4	0.6	4.6
New Jersey	50.5 [a]	15.6 [a]	13.60	1.31	6.9	0.7	7.1
Pennsylvania	62.0	16.8	13.34	1.00	6.1	0.8	4.3
Ohio	62.2	22.0	16.84	1.21	7.2	1.0	3.3
Indiana	55.9	12.0	14.77	.80	5.6	1.4	7.8
Illinois	61.6	16.1	14.43	1.07	6.8	1.1	3.4
Michigan	58.8	15.1	16.43	1.15	6.6	0.6	2.1
Wisconsin	55.9	15.6	13.04	.91	7.1	0.5	2.1
Minnesota	60.7	15.4	15.54	1.08	7.9	0.4	0
Iowa	62.2	17.6	16.33	.90	7.1	0.5	4.0
Missouri	56.4	13.4	12.47	.87	4.3	2.2	15.2
North Dakota	54.7	13.5	13.59	.81	12.2	0.3	0
South Dakota	58.1	15.4	13.92	.89	8.0	0.3	1.2
Nebraska	65.9	15.8	15.81	.96	6.8	0.4	5.5
Kansas	62.6	14.6	13.60	.90	4.7	0.6	6.8
Delaware	49.2	11.7	12.32	.85	7.8	2.0	19.7
Maryland	55.3	11.2	10.67	.93	6.5	2.0	6.3
Virginia	56.1	13.8	8.02	.58	5.2	6.1	17.9
West Virginia	54.8	13.5	9.00	.64	4.0	4.8	15.9
North Carolina	38.2	5.8	5.86	.42	3.5	8.2	21.9
South Carolina	45.0	6.2	4.77	.33	3.3	6.6	26.1
Georgia	39.3	8.2	5.12	.33	2.6	5.5	23.9
Florida	53.7	16.3	13.61	1.07	2.6	3.1	9.9
Kentucky	41.5	6.8	5.97	.39	3.7	7.3	10.2
Tennessee	44.0	9.7	5.94	.33	3.2	7.4	22.4
Alabama	41.3	8.2	4.36	.29	2.8	6.4	20.3
Mississippi	37.6	4.3	5.15	.23	2.2	3.6	20.0
Arkansas	35.6	3.4	5.69	.27	2.1	4.6	19.0
Louisiana	36.1	7.1	6.49	.51	2.3	11.4	28.4
Oklahoma	42.9	8.8	10.05	.62	2.4 [b]	2.4	14.1
Texas	43.4	6.6	9.43	.50	2.9	2.2	14.3
Montana	68.2	16.9	18.56	1.29	6.7	0.3	0.4
Idaho	62.3	19.0	17.09	1.15	6.0	0.3	10.4
Wyoming	65.1	18.4	20.85	1.78	4.6	0.4	3.6
Colorado	67.0	23.2	17.97	1.29	7.9	1.7	8.4

SEVEN INDICES OF THE CULTURAL-INTELLECTUAL DEVELOPMENT OF STATE POPULATIONS, ETC.—*Continued*

States	Army Alpha Examination, White Draft		Magazine Circulation per 100 Total Population, 1922		"Who's Who in America, 1922–1924," per 10,000 Average Total Population 1850–1880	Illiterate per 100 Native White of Native Parentage, 1920	Inaccuracies in Census Returns, for Whites Only
	Median Scores	*Per Cent of A-B Grades*	*"Widely Read" List*	*"Highbrow" List*			
	1	*2*	*3*	*4*	*5*	*6*	*7*
New Mexico	49.4	9.6	9.42	.67	0.9	11.9	14.0
Arizona	56.4[b]	12.9[b]	15.28	1.11	3.5	1.3	10.6
Utah	59.5	15.3	13.08	1.16	9.5	0.3	4.8
Nevada	60.3	13.9	21.25	1.94	5.4	0.4	18.7
Washington	72.0	23.4	24.10	1.63	8.6	0.3	1.5
Oregon	71.6	22.2	24.99	1.76	7.8	0.4	2.9
California	71.5	21.9	25.83	2.34	7.0	0.4	8.6
Median	55.7	14.1	13.51	1.02	6.1	2.4	10.5
Standard deviation	9.9	5.1	5.3	0.51	2.8	5.9	7.9

* Sources stated in text, Chapter VII.

[a] Corrected figure.

[b] Computed figure, *see* text.

APPENDIX N

MENTAL DEFICIENCY IN MEN OF MILITARY AGE, WORLD WAR PERIOD, FOR WHITES AND FOR NEGROES, BY STATES

	Persons in Institutions for the Feebleminded per 1,000 Total White Population[a]	Rejections for Mental Deficiency by Local Boards per 1,000 Men[b]	Diagnoses of Mental Deficiency by Army Psychiatrists	
			Per 1,000 Men, White[c]	*Per 1,000 Men, Negro*[c]
United States, Total	0.44	8.94	4.94	10.13
New England				
Maine	0.6	16.7	7.5	—
New Hampshire	0.9	7.4	2.4	—
Vermont	0.5	27.1	3.2	—
Massachusetts	0.8	8.0	2.7	4.1
Rhode Island	0.6	13.4	3.3	—
Connecticut	0.4	8.0	3.1	4.9
Middle Atlantic				
New York	0.7	7.3	3.3	4.5
New Jersey	0.5	6.1	3.5	2.4
Pennsylvania	0.5	8.0	5.1	7.2
East North Central				
Ohio	0.4	9.9	4.4	5.7
Indiana	0.5	9.5	3.7	2.9
Illinois	0.4	7.0	2.9	5.3
Michigan	0.6	8.4	4.4	5.7
Wisconsin	0.6	9.7	3.5	2.7

MENTAL DEFICIENCY IN MEN OF MILITARY AGE, WORLD WAR PERIOD, ETC.—*Continued*

	Persons in Institutions for the Feebleminded per 1,000 Total White Population [a]	Rejections for Mental Deficiency by Local Boards per 1,000 Men [b]	Diagnoses of Mental Deficiency by Army Psychiatrists	
			Per 1,000 Men, White [c]	*Per 1,000 Men, Negro* [c]
West North Central	0.8	9.0	2.5	—
Minnesota	0.7	12.1	2.4	3.0
Iowa	0.2	9.3	7.2	6.6
Missouri	0.5	7.6	4.0	—
North Dakota	0.7	11.3	3.4	—
South Dakota	0.6	4.8	2.5	—
Nebraska	0.4	6.9	2.8	1.5
Kansas				
South Atlantic				
Delaware	0.3	5.4	3.2	10.7
Maryland	0.6	20.4	9.8	29.7
District of Columbia	—	7.2	1.7	9.2
Virginia	0.4	13.7	12.7	11.0
West Virginia	0.3	6.8	9.5	6.5
North Carolina	0.2	14.0	11.6	7.0
South Carolina	0.2	11.2	10.4	8.2
Georgia	0.0	8.4	9.2	3.7
Florida	0.2	7.5	6.8	1.1
East South Central				
Kentucky	0.2	12.5	10.7	5.3
Tennessee	0.0	15.3	8.9	27.8
Alabama	—	8.0	8.0	22.6
Mississippi	0.1	9.3	9.7	13.0
West South Central				
Arkansas	0.0	6.4	8.2	12.6
Louisiana	0.1	11.9	6.9	11.8
Oklahoma	0.2	9.2	5.2	15.8
Texas	0.1	8.4	3.0	3.4
Mountain				
Montana	0.2	2.8	1.3	—
Idaho	0.6	4.9	2.3	—
Wyoming	0.7	2.4	2.2	—
Colorado	0.3	6.8	3.4	—
New Mexico	—	10.5	16.6	—
Arizona	—	2.0	1.7	—
Utah	—	5.9	1.7	—
Nevada	—	2.3	2.2	—
Pacific				
Washington	0.6	6.9	2.2	—
Oregon	0.9	6.5	1.6	—
California	0.5	6.3	3.0	3.2

[a] From United States Bureau of the Census, 1923, *Feebleminded and Epileptics in Institutions*, p. 43.

Note: The number of Negroes in institutions for the feebleminded in most states is negligible.

[b] From United States Surgeon General's Office, Love and Davenport, 1921, *Defects Found in Drafted Men*, pp. 718–728, Class V_g.

[c] Absolute numbers of cases, by race, by state, reported by United States Surgeon General's Office, Bailey, Williams, and Komora, 1929, *Neuropsychiatry*, pp. 200–205, prorated on basis of numbers of recruits, by race, by state, supplied by Adjutant General's Office, Communication, August 31, 1931.

APPENDIX O

INDICES OF ENVIRONMENTAL CONDITIONS OF TOTAL FORCES AND NEUROPSYCHIATRIC CASES, IN UNITED STATES ARMY, WORLD WAR PERIOD

Groups	Education				Economic Status			Venereal Disease	
	None	*Some Grade Schooling*	*Some High School*	*Unascertained*	*Marginal*	*Comfortable*	*Unascertained*	*Syphilis Admitted*	*Gonorrhea or Others Admitted*
	Per Cent	*Per Cent*	*Per Cent*	*Per Cent*	*Per Cent*	*Per Cent*	*Per Cent*	*Per Cent*	*Per Cent*
White:									
Total forces	3.2	75.2	21.6	—	—	—	—	—	—
All neuropsychiatric cases (including mental deficiency)	14.4	67.9	12.4	5.1	82.3	12.0	5.7	7.5	19.7
All psychoses	6.8	68.3	17.6	6.8	78.4	14.5	7.1	8.7	21.4
Dementia praecox	7.1	70.7	15.5	6.2	82.4	10.8	6.7	4.6	18.8
Epilepsy	10.4	70.8	11.9	6.5	82.8	11.4	5.8	3.4	16.8
Mental deficiency	32.1	60.7	0.9	6.1	89.0	5.2	5.7	2.9	13.5
Negro:									
Total forces	13.5	76.0	10.5	—	—	—	—	—	—
All neuropsychiatric cases (including mental deficiency)	50.3	46.4	1.6	1.5	95.2	2.6	2.2	26.1	51.3
All psychoses	31.1	62.0	2.5	4.3	88.7	6.8	4.5	26.1	44.1
Dementia praecox	30.4	64.6	1.9	2.9	87.2	8.2	4.6	19.0	41.7
Epilepsy	42.4	54.4	2.3	0.9	95.2	3.1	1.7	24.4	54.0
Mental deficiency	68.8	29.7	0.1	1.3	97.4	0.8	1.8	23.4	49.5

* Adapted from U. S. Surgeon General's Office, Bailey, Williams and Komora, 1929, *Neuropsychiatry*, pp. 188–194. Figures for total forces based on analysis of random sample of 80,000 men, white and colored.

APPENDIX P

DISTRIBUTION OF HAGGERTY INTELLIGENCE QUOTIENTS OF 6,688 PUPILS, GRADES III–VIII, NEW YORK RURAL SCHOOLS, BY SPECIFIC OCCUPATION OF FATHER *

Parental Occupations	Cases	Median	Middle Fifty per Cent $Q_1 - Q_3$
Professional	349	116	105–130
Business and clerical	944	107	94–121
Skilled	1,028	98	87–111
Semi-skilled	524	95	84–107
Farmer	3,098	91	82–103
Unskilled	745	89	77–102
Official	33	120	101–129
Insurance	36	119	106–131
Lawyer	53	119	107–132
Teacher	47	118	102–128
Office worker	85	114	95–127
Doctor	26	114	102–128
Accountant	28	113	106–125
Foreman (or manager)	153	109	96–122
Minister	27	109	95–122
Electrician	34	107	95–120
Manufacturer	64	107	94–122
Salesman	126	106	95–124
Barber	34	104	88–114
Clerk	45	103	91–116
Retail merchant	329	103	93–118
Plumber	28	101	94–108
Mechanic	103	101	90–115
Machinist	89	99	90–107
Painter	86	98	86–107
Tailor	30	98	83–110
Engineer	76	98	87–111
Mail-carrier	39	97	87–109
Metal-worker	58	96	87–111
Contractor	61	96	82–115
Truck-driver	77	96	80–107
Chauffeur	43	96	86–107
Carpenter	237	96	86–107
Janitor	28	95	83–107
Factory-hand	269	93	81–103
Blacksmith	43	92	82–103
Farmer	3,098	91	82–103
Laborer	691	89	76–102
Stone-worker	41	88	76–98
Mason	53	87	79–105
Miner	54	80	72–87

* Adapted from Haggerty and Nash, 1924, "Mental Capacity of Children and Paternal Occupation," *J. of Educational Psychology*, Vol. 15, pp. 564, 569.

APPENDIX Q

EXPECTED DISTRIBUTION OF TOTAL INTELLIGENCE QUOTIENT POINTS IN TWO SUCCESSIVE GENERATIONS ON BASIS OF (I) DISTRIBUTION REPORTED BY HAGGERTY AND NASH, APPLIED TO TOTAL NUMBERS OF CHILDREN BORN IN 40 STATES, BY OCCUPATION OF FATHER, 1928, AND (II) ESTIMATED REPRODUCTION RATES FOR OCCUPATIONAL CLASSES

TABLE 1

First Generation *

	Unskilled	Agriculture	Semi-Skilled	Skilled	Business and Clerical	Professional	Total
Total Births, 1928	388,000	622,000	280,000	309,000	354,000	66,000	2,019,000
I.Q. Classes							
140 & up	1,552	5,411	3,220	5,995	10,762	7,755	34,695
130–139	4,152	10,014	7,476	10,815	24,001	9,266	65,724
120–129	12,494	25,129	11,760	23,453	60,853	11,537	145,226
110–119	37,481	58,219	28,868	42,364	60,746	13,616	241,294
100–109	47,918	98,774	58,240	60,997	70,517	12,665	349,111
90–99	80,743	145,113	64,120	73,017	60,746	7,181	430,920
80–89	77,057	140,323	62,524	53,797	40,887	3,590	378,178
70–79	72,401	91,558	35,252	25,554	17,983	376	243,124
60–69	40,119	37,320	11,732	11,093	7,115	—	107,379
50–59	13,037	12,005	2,660	1,792	35	—	29,529
Sum	386,954	623,866	285,852	308,877	353,645	65,986	2,025,180

Median Intelligence Quotient, total population: 95.90

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* Values obtained by multiplying number of births in each occupational class by per cent of each occupational class expected at each I.Q. level. The sums differ somewhat from the original totals due to lack of refinement in statistics, two-place decimals only being used. This difference is exaggerated in the third column due to a minor error in the original text (*see* notes to Table 56, above).

TABLE 2

Second Generation *

	Unskilled	Agri- culture	Semi- Skilled	Skilled	Business and Clerical	Pro- fessional	Total
At specified reproduction rates per generation	1.17	1.32	1.03	1.06	.85	.76	
I.Q. Classes							
140 & up	1,816	7,143	3,317	6,355	9,148	5,894	33,673
130–139	4,857	13,219	7,700	11,464	20,401	7,043	64,684
120–129	14,618	33,170	12,113	24,860	51,725	8,768	145,254
110–119	43,853	76,849	29,734	44,906	51,634	10,348	257,324
100–109	56,064	130,381	59,987	64,657	59,939	9,626	380,654
90–99	94,469	191,549	66,044	77,398	51,634	5,457	486,551
80–89	90,157	185,227	64,400	57,025	34,754	2,729	434,292
70–79	84,709	120,857	36,310	27,087	15,286	286	284,535
60–69	46,940	49,262	12,084	11,759	6,048	—	126,093
50–59	15,253	15,846	2,740	1,900	30	—	35,769
Sum	452,736	823,503	294,429	327,411	300,599	50,151	2,248,829

Median Intelligence Quotient, total population: 95.01

* Values obtained by applying estimated reproduction index for each occupational class to total points in each sub-class in Table 1.

APPENDIX R

NORMAL RELATION OF FREQUENCIES OF EXTREME INTELLIGENCE QUOTIENTS TO GROUP MEANS

Terman, 1925, discussing the expectation of children with intelligence quotients of 140 points or over, comments as follows:

> "Examination of the statistical probabilities will show that even a moderate difference in the mean IQ of two race or nationality groups is sufficient to cause very large differences in the proportion of individuals testing at either extreme. The mean IQ of California white children residing in urban communities is approximately 100, and the P.E. of the distribution is approximately 10. On the basis of a normal distribution, the expected frequency of children testing as high as 140 would be 35 in 10,000, or one individual in 286. If the mean IQ were 90 and the P.E. of the distribution were still 10, the proportion of cases reaching 140 would be only 3.8 in 10,000, or one in 2,632. If the mean of 90 were accompanied by a P.E. of about 9, as would most probably be the case, the proportion reaching 140 would be much less than 1 in 2,632. One can at least say that a mean IQ of 90 is not likely to produce more than a tenth as many individuals above 140 as a mean IQ of 100 will produce" (pp. 57–58).

The general significance of the principle utilized by Terman may be stated as follows Assuming normal distribution, the frequency of individuals within a specified range of intelligence quotients (e.g., I.Q. 100–113.3, or I.Q. 140 or over) can be stated in terms of the mean and the standard deviation (sigma)—or in terms of the median and the probable error, since in a normal distribution the median is the same as the mean and the probable error has a fixed relation to the standard deviation (P.E. = .6745 σ). The standard deviation is the square root of the average of the squares of the deviations (differences from the mean) of the members of the group. In Terman's original standardization group, sigma is 13.3. In groups with a lower mean intelligence quotient, sigma is apt to be somewhat lower, but this is often not the case. For example, Jones for a sample of 351 Northern New England village children reports mean I.Q. 93.4, sigma 14.7. In order to simplify procedure, at small expense in accuracy, we shall set up the hypothesis of a series of groups with different averages, but all having the same standard deviation, assumed to be 13.3 I.Q. units. A group with a mean I.Q. of 86.7 points may then be said to have a mean which is one sigma (of either distribution) below the mean of a "standard population" with a mean I.Q. of 100. Similarly, all individuals in any group with I.Q.'s below 66.7 may be said to be about 2.5 σ or more below the mean of standard population, or 1.5 σ or more below the mean of the group with 86.7 mean I.Q. Turning to a table of "Areas and ordinates of the normal curve" (cf. Appendix IV of Pearl's *Medical Biometry and Statistics*), we find that mental deficiency of the degree just mentioned (I.Q. 66.7 or below) may be expected in about 0.6 per cent of the standard population and in 6.7 per cent of the group with 86.7 mean I.Q.—or 10 times as frequently in the latter group as in the former. On the other hand, many members of the group with the lower average will score one sigma or more above the mean of that group, and thus equal or surpass the average individual in the standard population. We should expect this to happen in about 16 per cent of the members of the group with inferior central tendency (mean I.Q. 86.7). Some idea of these relationships may be gained by inspection of the following hypothetical table.

HYPOTHETICAL TABLE SHOWING RELATION OF EXPECTED VARIATIONS AND OVERLAP TO DIFFERENCES IN CENTRAL TENDENCY IN INTELLIGENCE

Designation of Hypothetical Groups	Mean Values		Distribution Values		
	Group Means Defined by Sigma (σ) Values Relative to Mean I.Q. of Standard Group (M_s)	*Mean I.Q. of Each Group (Numerical Values)*	*Per Cent of Each Group with I.Q.'s Equal to or above Mean of Standard Group*	*Per Cent of Each Group with I.Q.'s below* 67.7 *($M_s - 2.5\ \sigma$), "Mentally Deficient"*	*Per Cent of Each Group with I.Q.'s above* 126.6 *($M_s + 2\ \sigma$), "Superior"*
Standard					
S	M_s	100	50.0	0.62	2.28
Inferior					
B	$M_s - 0.25\ \sigma$	96.7	40.1	1.22	1.22
C	$M_s - 0.33\ \sigma$	95.6	38.1	1.50	0.99
D	$M_s - 0.50\ \sigma$	93.3	30.8	2.28	0.62
E	$M_s - 0.67\ \sigma$	91.1	25.1	3.36	0.38
F	$M_s - 1.00\ \sigma$	86.7	15.9	6.68	0.13
	$M_s - 1.67\ \sigma$	77.8	4.8	20.33	0.01
Superior					
H	$M_s + .33\ \sigma$	104.4	62.9	0.23	4.75

APPENDIX S

SUPPLEMENTARY DATA ON FECUNDITY FROM DAVIS SERIES

TABLE 1

Distribution of 308 Wives, Aged 40 Years or Over, According to Reported Numbers of Children, with Data on Pregnancies

Classes of Families, According to Number of Children Reported	Number of Wives in Each Class	Number of Wives in Each Class Reporting Deceased Children	Number of Wives in Each Class Reporting Artificial Abortions [a]	Number of Wives in Each Class Reporting Excess Pregnancies—Including Spontaneous Abortions, Miscarriages, Stillbirths, and Deceased Children not Otherwise Reported [b]
0	60	—	4	11 [c]
1	55	4	4	17
2	75	3	13	25
3	64	4	6	31
4	36	6	4	16
5	13	3	—	10
6	3	1	—	1
7	2	2	—	1
Total	308	23	34	112

[a] Exclusive of removal of non-living foetae, operations for specific genital disorders involving abortion, and pre-marital abortions.

[b] Two women report "several miscarriages"; each case is listed as 3 in this summary.

[c] All except 2 of the 11 wives reporting excess pregnancies in the "0 children" group specify miscarriages or stillbirths.

TABLE 2

Distribution of Children Borne and Other Pregnancies Reported by 308 Wives, Aged 40 Years or Over, According to Reported Numbers of Children

Classes of Families According to Number of Children Reported	Number of Children Reported in Each Class	Number of Deaths of Children Reported in Each Class	Number of Artificial Abortions Reported in Each Class	Excess of Pregnancies Reported in Each Class
0	—	—	5	19 [a]
1	55	4	5	24
2	150	3	20	41
3	192	5	9	44
4	144	6	6	24
5	65	4	4	17
6	18	2	—	2
7	14	2	—	1
Total	638	26	49	172

[a] Of these 19 excess pregnancies to women with no children, 5 (reported by 2 women) are not specified. The other 14 cases are specifically designated as accidental miscarriages or stillbirths.

TABLE 3

Per Cent Distribution of Families by Numbers of Children Ever-Born, in Davis Series, and in English Marriages Formed 1861–1871

Number of Children	English Marriages, 1861–1871, Standardized with Regard to Wives' Ages at Marriage on Basis of the Davis Series[a]	Davis Series: 308 American Wives, Mostly College Graduates	
		No Artificial Limitation of Births	*Total Sample*
	Per Cent	*Per Cent*	*Per Cent*
0	11.6	12.3	19.5
1	6.1	7.1	17.9
2	7.7	5.5	24.3
3	8.7	4.2	20.8
4	9.7	0.6	11.7
5	9.7	0.3	4.2
6	9.7	0.6	1.0
7	8.9	0.0	0.6
8	7.8		
9	6.3		
10	5.0		
11	3.3		
12	2.5		
Over 12	3.1		
Total	100.1	30.6	100.0

[a] Data on size of families from Great Britain, General Register Office, *Census of England and Wales, 1911, Vol. 13, Fertility of Marriage.*

TABLE 4

Percentage Distribution of Types of Response to Sex in 25 Sterile Marriages, 17 Marriages Limited in Fecundity to One Child, and in Two Samples of Fecund Marriages (51 Cases in Each Sample). Davis Series

Class of Marriage as Regards Fertility	Number of Cases	Reporting Specified Type of Response to Sex in Marriage					
		Positive per Cent	*Doubtful per Cent*	*Mixed per Cent*	*Neutral per Cent*	*Negative per Cent*	*Total per Cent*
Sterile marriages							
1. Wife married at 16–32 years, husband married at 16–50 years	16	6	19	31	19	25	100
2. All cases (including the above)	25	24	16	24	16	20	100
Marriages limited in fecundity to one child	17	48	6	18	18	12	100
Fecund marriages							
1. Three children with use of contraceptives	51	46	10	20	20	6	100
2. Four or more children	51	60	12	18	4	6	100

APPENDIX T

FAMILIES WITH SPECIFIED NUMBER OF CHILDREN EVER-BORN PER 1,000 FAMILIES OF COMPLETED FERTILITY, BY DATE OF MARRIAGE AND BY WIFE'S AGE AT MARRIAGE. ENGLISH COUPLES, MARRIED 1851–1896 *

Number of Children Ever-Born	Wife's Age at Marriage	1851–1861	1861–1871	1871–1881	1881–1886	1886–1891	1891–1896
None	15–19	40	35	32	32	—	—
	20–24	59	58	55	55	57	—
	25–29	86	98	103	104	113	116
	30–34	136	158	171	189	208	218
	35–39	—	299	382	428	471	510
One	15–19	25	26	29	35	—	—
	20–24	32	33	40	52	62	—
	25–29	41	50	62	81	100	121
	30–34	74	75	97	122	139	162
	35–39	—	169	177	195	200	201
Two	15–19	31	33	38	48	—	—
	20–24	40	42	60	81	97	—
	25–29	60	68	91	120	139	164
	30–34	100	107	125	149	165	182
	35–39	—	170	162	159	142	138
Three	15–19	35	39	50	62	—	—
	20–24	48	54	77	97	111	—
	25–29	73	81	109	131	145	159
	30–34	101	131	144	151	152	155
	35–39	—	141	123	105	91	81
Four or more	15–19	869	867	851	823	—	—
	20–24	821	813	768	715	673	—
	25–29	740	703	635	564	503	440
	30–34	589	529	463	389	336	283
	35–39	—	221	156	113	96	70

* Adapted from *Census of England and Wales, 1911*, Vol. 13, Part 2, Table XVI.

APPENDIX U

ANSWERS OF ENGLISH CLERGY ON "INFLUENCE OF ECONOMIC CONSIDERATIONS ON SIZE OF FAMILY." HUNTINGTON SERIES

	Number of Cases	Percentage Distribution		
		Economic Considerations "Have Influenced" Size of Family	*Economic Considerations "Have Not Influenced" Size of Family*	*No Answer*
Total	975	23.3	50.4	26.3
Age groups				
According to age of wife at time of report				
60 or over	225	10	52	38
50–59	363	20	52	28
40–49	387	33	48	19
Denominational groups				
Wesleyan M.E.	262	21	51	28
Primitive M.E.	242	25	53	22
Combined M.E.	504	23	52	25
Baptist	216	20	47	33
Congregational	255	26	51	23
Combined Baptist and Congregational	471	23	49	28

APPENDIX V

LIFE-TABLE AND FERTILITY DATA FOR NEW ZEALAND

TABLE 1

LIFE-TABLE DATA FOR NEW ZEALAND FEMALES, 1925–1928, WITH FEMALE INFANT MORTALITY RATE OF 1928

Age	Estimated Number of Females in Population, December 30, 1926[a]	Total Deaths, Females, 1925–1928	Mean Annual Death Rate, Females	Probability of Survival of Females from Beginning to End of Each Period[d]	Probability of Survival of Females from Birth to Beginning of Specified Period (l_x)	Expected Average Proportion of Each 5-Year Period Lived by Each Female Born Alive $\left(\frac{l_x+l_{x+5}}{2}\right)$
0–1	—	—	.02864[c]	.9714	1.0000	
1–2	13,270	322	.00606	.9932	.9714	
2–5	40,544	452	.00278	.9911	.9648	
5–10	66,030	374	.00141	.9918	.9562	
10–15	66,606	286	.00107	.9947	.9484	
15–20	61,685	395	.00160	.9921	.9409	.9349
20–25	55,679	578	.00260	.9872	.9289	.9227
25–30	52,492	604	.00276	.9865	.9164	.9088
30–35	50,283	652	.00324	.9833	.9011	.8927
35–40	50,304	759	.00377	.9813	.8842	.8765
40–45	47,308	807	.00426	.9788	.8687	.8595
45–50	42,128	1,108	.00657	.9687	.8503	.8470
50–					.8237	

[a] Census of April 20, 1926, multiplied by 1.014 to correct for increase, April to December, at 1921–1926 rate (10.3). Dominion of New Zealand, *Population Census, 1926*, Vol. 1, p. 2; Vol. 3, pp. 10, 14.

[b] Dominion of New Zealand, *Vital Statistics, 1928*, p. 26.

[c] Female infant mortality rate of 1928; deaths of female infants under one per female born alive. *New Zealand Official Year-Book*, 1930, p. 143. Corresponding rate in 1929, .02822 (*New Zealand Official Year-Book, 1931*, p. 143).

[d] *See* formulae and tables by Snow, "An Elementary Rapid Method of Constructing an Abridged Life Table," *Supplement to the 75th Annual Report of the Registrar General, England and Wales, 1920*, Part II.

TABLE 2

Fertility, Survival, and Net Reproduction Tables, New Zealand, 1926

Age Classes of Mothers	Live Births in 1926 [a] *A*	Estimated Number of Daughters (48.5% of All Births) *B*	Estimated Number of Daughters in Five Years *C*	Number of Females at Specified Ages, April 20, 1926 [b] *D*	Maternal Frequencies, Daughters Only *E*	Expected Proportion of Period Lived per Daughter Born Alive [c] *F*	Net Reproduction Frequencies *G*
15–19	1,245	603.8	3,019	60,833	.0496	.9349	.0464
20–24	6,224	3,018.7	15,093	54,910	.2749	.9227	.2537
25–29	8,315	4,032.8	20,164	51,767	.3895	.9088	.3540
30–34	6,573	3,187.9	15,940	49,589	.3214	.8927	.2869
35–39	4,275	2,073.4	10,367	49,609	.2090	.8765	.1832
40–44	1,556	754.7	3,773	46,655	.0809	.8595	.0695
44–49	162	78.6	393	41,546	.0095	.8470	.0080
Total	28,350	13,749.9	68,749	354,909	1.3348		1.2017

Gross reproduction ratio (total of column *E*)	1.3348
Net reproduction ratio (total of column *G*)	1.2017
Reproduction survival ratio (*N.R.R./G.R.R.*)	.900
Number of *daughters* born alive producing one female with mean fertility expectation (*G.R.R./N.R.R.*)	1.111
Number of *children* born alive producing one female with mean fertility expectation (*G.R.R./.485 N.R.R.*)	2.29

[a] Dominion of New Zealand, *Vital Statistics, 1926*, p. 6.

[b] Dominion of New Zealand, *Population Census, 1926*, Vol. 3, p. 10. (Values for April 20, 1926, used without correction.)

[c] Table 1, above.

APPENDIX W

INDIVIDUAL AND FAMILY REPLACEMENT VALUES

TABLE 1

Reproduction-Survival and Sex-Ratio-at-Birth Data

Population Samples	Gross Reproduction Ratio *G.R.R.*	Net Reproduction Ratio *N.R.R.*	Reproduction-Survival Ratio *N.R.R./G.R.R.*	Complete Fertility Correction Factor *C.F.*	Total Births per Female Birth T_o/F_o
New Zealand, 1925–1928	1.3348[a]	1.2017[a]	.9003	.0084[d]	2.06[e]
Whites, U.S., 1919–1920	1.4204[b]	1.1676[b]	.8220	.0154[d]	2.06[f]
Negroes in seven Southern states, 1919–1920	1.6551[c]	1.1760[c]	.7105	.0337[d]	2.027[f]

[a] Appendix V, Table 2, above.

[b] Dublin and Lotka, 1925, "On the True Rate of Natural Increase as Exemplified by the Population of the United States, 1920," *J. of American Statistical Association*, Vol. 20, p. 309.

[c] Holmes, S. J., and Parker, S. L., "The Stabilized Natural Increase of the Negro," *J. of the American Statistical Association*, Vol. 26, p. 164. Values based on registration data. Corrections proposed by these authors do not affect derivative values.

[d] Table 4, below.

[e] Dominion of New Zealand, *Vital Statistics, 1926.*

[f] *United States Birth, Stillbirth and Infant Mortality Statistics, 1920.*

TABLE 2

Marital Proportions among Whites (or Native Whites), United States, 1930

Marital births per total births, whites, U.S. Birth Registration Area, 1928–1929 (M_o/T_o)	.987[a]
Ever-wedded females per native white woman aged 40–44 years, 1930 (F_{w40-44}/F_{40-44})	.890
Years lived as married (not widowed or divorced) per year since first marriage during childbearing period, native whites (F_{m15-44}/F_{w15-44})	.944[b]

[a] *U.S. Birth, Stillbirth and Infant Mortality Statistics, 1929,* p. 13.

[b] Ratio of married females, native whites, aged 15–44 years to married *plus* widowed *plus* divorced females, native whites, aged 15–44 years. Census data.

TABLE 3

Formulae for Replacement Quotas[a]

Quota A $= (G.R.R. \div N.R.R. = 1 \div F.S.R.)\ (T_o/F_o)$.
Quota B = Authority cited.
Quota C $= 1 \div (F.S.R. - C.F)\ (T_o/F_o)$.
Quota D $= C \times (M_o/T_o)\ (F_{w40-44}/F_{40-44})$.
Quota E $= D \div (F_{m15-44}/F_{w15-44})$.

[a] *See* Chapter XII, Table 101. *See also* Appendix A.

TABLE 4

REPRODUCTIVE LOSS DUE TO DEATHS OF FEMALES BETWEEN FERTILITY-SURVIVAL CENTER AND END OF CHILDBEARING PERIOD [*]

Samples and Age Classes	Maternity Frequencies (Daughters Only) per 1,000 Women in Successive Age Periods (*a*)	Difference between Reproduction-Survival Ratio and Probability of Survival to Center of Specified Age Classes (*b*)	Specific Losses of Potential Births Due to Deaths of Females after *S.R.R.* (*a*×*b*)	Ratio of Sum of Such Losses to All Potential Births
Whites, U.S., 1919–1920				
All ages	1,420.4 [a]			
30–34	289.0	.8220−.8018=.0202	5.838	
35–39	194.9	.8220−.7742=.0478	9.316	
40–44	77.6	.8220−.7466=.0754	5.851	
45–49	8.6	.8220−.7161=.1059	.911	
30–49	570.1		21.916	
Correction factor				.0154
Negroes in seven Southern states, 1910–1920 [b]				
All ages	1,655.1 [a]			
30–34	305.4	.7105−.6649=.0546	16.675	
35–39	224.5	.7105−.6123=.0982	22.046	
40–44	91.0	.7105−.5619=.1486	13.523	
45–49	17.7	.7105−.5095=.2010	3.558	
30–49	638.6		55.802	
Correction factor				.0337
New Zealand, 1925–1929				
All ages	1,334.8 [a]			
30–34	321.4	.9003−.8927=.0076	2.443	
35–39	209.0	.9003−.8765=.0238	4.974	
40–44	80.9	.9003−.8595=.0408	3.301	
45–49	9.5	.9003−.8470=.0533	.506	
30–49	620.8		11.224	
Correction factor				.0084

[*] Sources as in Table 1. *See also* footnote, pp. 354–355.

[a] Gross reproduction rate per generation.

[b] Fertility data for five states; mortality data for seven states.

GLOSSARY

A few technical terms or terms used in a special sense in this text are described below. A few other technical terms relating to population study have been defined as they were introduced.

Allelomorph. See *Gene.*

Association or *Correlation.* A *positive* correlation between two series means that high ratings in one series tend to appear in the same individuals, or under the same circumstances, as high ratings in the other series, with corresponding similarity in low ratings. When high values in one series tend to appear with low values in the other series the correlation is said to be *negative.* Degrees of correlation are indicated by various coefficients. The coefficient most commonly used (r) developed by Pearson gives positive values from 0 to 1 and negative values from -1 to 0. For example, the expression, $r = .15 \pm .075$, indicates a low correlation, only twice its probable error and therefore of doubtful significance. The expression, $r = .62 \pm .059$, would indicate a high correlation and one of undoubted significance, subject to certain limitations about the nature of the samples used. (See *Probable error,* below).

Cultural-intellectual development. This expression is used to denote the quality measured by intelligence tests or other indices of mental life that correlate well with intelligence test results. This expression, which is admittedly somewhat awkward, is adopted as a safeguard against a widespread popular idea that "intelligence," as measured by intelligence tests, can be accepted immediately as a hereditary quality.

Demography. See *Social demography.*

Differential reproduction. The term *differential fertility* is well established as indicating a tendency toward variation in fertility rates among population groups. By analogy, *differential reproduction* denotes a tendency toward variation in reproduction rates among population groups. (These uses are influenced by the more exact meaning of a *differential* in calculus, an infinitesimal or arbitrarily small change defined in the analysis of the behavior of a variable. *Differential reproduction* among groups, however, ordinarily denotes merely variation in reproduction rates.)

Dominants and recessives. A *dominant* is a hereditary character derived from one of the parents of an individual and exhibited in this individual, to the exclusion of the contrasted character received from the other parent. The contrasted character, called a *recessive,* although not appearing in such an individual, is transmitted to its descendants. An individual receiving the genetic factors for a recessive character from both parents will exhibit the trait. Any individual receiving from the two parents the same genetic factors for any trait is said to be *homozygous* with respect to that trait. Any individual receiving different factors is said to be *heterozygous.* Thus dominant traits appear both in "homozygous dominants" and in "heterozygous" individuals; but recessive traits appear only in "homozygous recessives."

Dynamics. The operation, or description, of forces producing motions, and their effects. "The moving moral, as well as physical, forces of any kind, or the laws which relate to them" (Second definition, *Webster's New International Dictionary*). The term *dynamics of population* is used to denote a study of the causes and effects of population changes.

Effective fertility. Fertility (see below), as modified by "child mortality" (deaths of young children) is here called *effective fertility.* "Effective fertility" is used here to designate the tendency indicated by a ratio of children under five years of age to a given number of women of specified childbearing ages.

Fecundity.[1] Physiological capacity to participate in reproduction.

Fertility.[1] Fecundity expressed in performance, and therefore measurable. Synonymous with *natality*, the birth performance of a group, correlative with *mortality*.

Gene. A unit of inheritance. A particular *locus* in a particular type of chromosome, which is always occupied by one of a particular pair, or series, of *allelomorphs*. Pairs of chromosomes (tiny bodies, visible when stained) can be seen in a cell at the time of cell division, as in the formation of ova (in the female) or sperms (in the male). Each ovum, or each sperm, receives one chromosome of each type. It has been established that particular groups of genes are arranged in linear order in particular types of chromosomes. Each *gene locus* in any species is always occupied by one of a particular pair, or series, of *allelomorphs*, or *gene phases*. Each unit character in heredity is determined by the substitution of a particular gene phase for its alternative phase, or allelomorph.

Genotype and phenotype. A *genotype* is an individual defined with reference to the genetic characteristics which it has received and which it will transmit to offspring. A *phenotype* is an individual defined with reference to its apparent characteristics. Therefore, in so far as any individual carries gene phases for recessive characters, its genotypic qualities will differ from its phenotypic qualities.

Homozygous and heterozygous. See *Dominants and recessives.*

Intelligence quotient or I.Q. Intelligence in relation to age, or in the case of adults, in relation to a standard "adult level." The use of intelligence quotients involves the conception of mental age, developed by Binet, and the conception of an adult level beyond which growth in intellectual capacity is not expected. Unless otherwise stated, the adult level is conventionally understood as equivalent to a mental age of sixteen years. The ratio of mental age (M.A.) to chronological age (C.A.) is the intelligence quotient (I.Q.). The primary reference in statements of mental age or in estimates of I.Q., as revised by Terman (commonly referred to as the "Stanford-Binet" intelligence tests) or in the case of very young children to the Kuhlmann revision of the Binet scale. Intelligence quotients are also derived from other tests by estimating the mental age expected with a revised Binet scale from the results obtained on another test.

Life table. A collection of columns of figures representing various functions involving life contingencies for any specified population, including: l_x, the proportion of persons born alive who are expected to survive to any given age x; p_x, the probability of a person aged x living a year; and $\mathring{e}_x$, the complete expectation of life, or total future lifetime which on the average will be passed through by a person aged exactly x.

Mean, median, mode. Measures of central tendency of a series of cases having different values. *Mean:* the average value; the sum of all values divided by the number of cases. *Median:* the value below which half of the cases lie. (Similarly, *first quartile:* the value below which one-fourth of the cases lie; *first decile:* the value below which one-tenth of the cases lie; *first percentile:* the value below which one-hundredth of the cases lie.) *Mode:* the value which occurs most frequently, or the mid-point of the class of values which contains the most cases.

Natality. See *Fertility.*

Normal frequency distribution. Distribution resulting from the hypothesis that deviations from the mean are due to the sum of a large number of very small influences, each of which is equally likely to be present or absent. The curve representing a normal frequency distribution is bell-shaped.

Population group. Any group studied with reference to changes in its size and composition. In the present study population groups are chiefly defined with reference to race and nativity, region and type of community, and social relations, especially occupational status.

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[1] Definition recommended by the College of Fellows of the Population Association of America, May 12, 1933.

Population replacement quota. "Replacement quotas" can be described for various groups, representing the number of births or numbers of children needed under specified conditions to *replace* in equal numbers losses expected to result from deaths under these conditions, or if the quota is defined with reference to adults of specified age, numbers sufficient to replace reduction in this group by death or by passage to higher age classes.

Probable error. See *Standard deviation.*

Reproduction index. The ratio of the number of births or number of children found in any group under specified conditions to the corresponding replacement ratio gives a reproduction index, or *estimated rate of reproduction per generation.* Thus a reproduction index of 1.25 indicates an expected natural increase of 25 per cent per generation; a reproduction index of .75 indicates an expected natural decrease of 25 per cent (or a natural "increase" of *minus* 25 per cent) per generation.

Social demography. The term *demography* has sometimes been limited to the formal aspects of vital statistics: natality rates, mortality rates, and rates of natural increase. It is sometimes extended to include studies of the causes and social consequences of population trends. The term *social demography* is used here to denote this broader reference. The present study might be described as an Introduction to the Social Demography of the United States.

Social eugenics. "Eugenics," according to Galton, who coined the word, "is the study of agencies under social control which may improve or impair the racial qualities of future generations either physically or mentally." Eugenics has sometimes been conceived primarily with reference to the consequences to be expected from particular matings, or, in other words, emphasis has frequently been placed on "Individual Eugenics" or "Family Eugenics." The present study deals with the qualitative aspects of broad population trends, as a basis for the formulation of public policies. The term "Social Eugenics" is used to indicate this interest.

Standard deviation, standard error, and *probable error. The standard deviation* (σ, sigma) is a measure of the scatter or dispersion of values in a series. The standard deviation of a series is the square root of the mean of the squares of individual deviations from the mean of the series ($\sigma = \sqrt{\frac{1}{N}\Sigma d^2}$). The *standard error* (also denoted as σ, sigma) of a statistical measure derived from any sample is the *estimated* standard deviation of the corresponding measures for all possible samples selected under the same conditions. The standard error of the mean (σ_m) of a series is derived from the standard deviation of the series (σ), using the formula: $\sigma_m = \frac{\sigma}{\sqrt{N-1}}$ where N represents the number of cases in the series. The *probable error* of any statistical measure is an estimated value which represents the *deviation* from the corresponding true value which would normally be exceeded in *half* of an infinite series of similar experiments, due to errors of random sampling. The probable error (*P.E.*) of any statistical measure has, on the assumption that errors are normally distributed, a fixed relation to its standard error (σ): $P.E. = .6745\ \sigma$.

Vitality. Innate capacity to survive, without reference to the influence of environment. (See Sydenstricker, 1933, *Health and Environment.*)

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CHAPTER V

PHYSICAL DEVELOPMENT

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CHAPTERS VI, VII, VIII

CULTURAL–INTELLECTUAL DEVELOPMENT

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BIOLOGICAL SIGNIFICANCE

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